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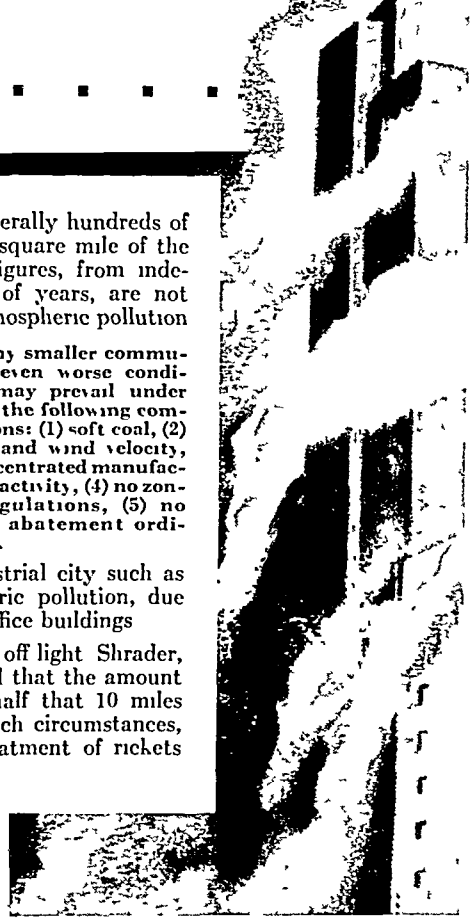
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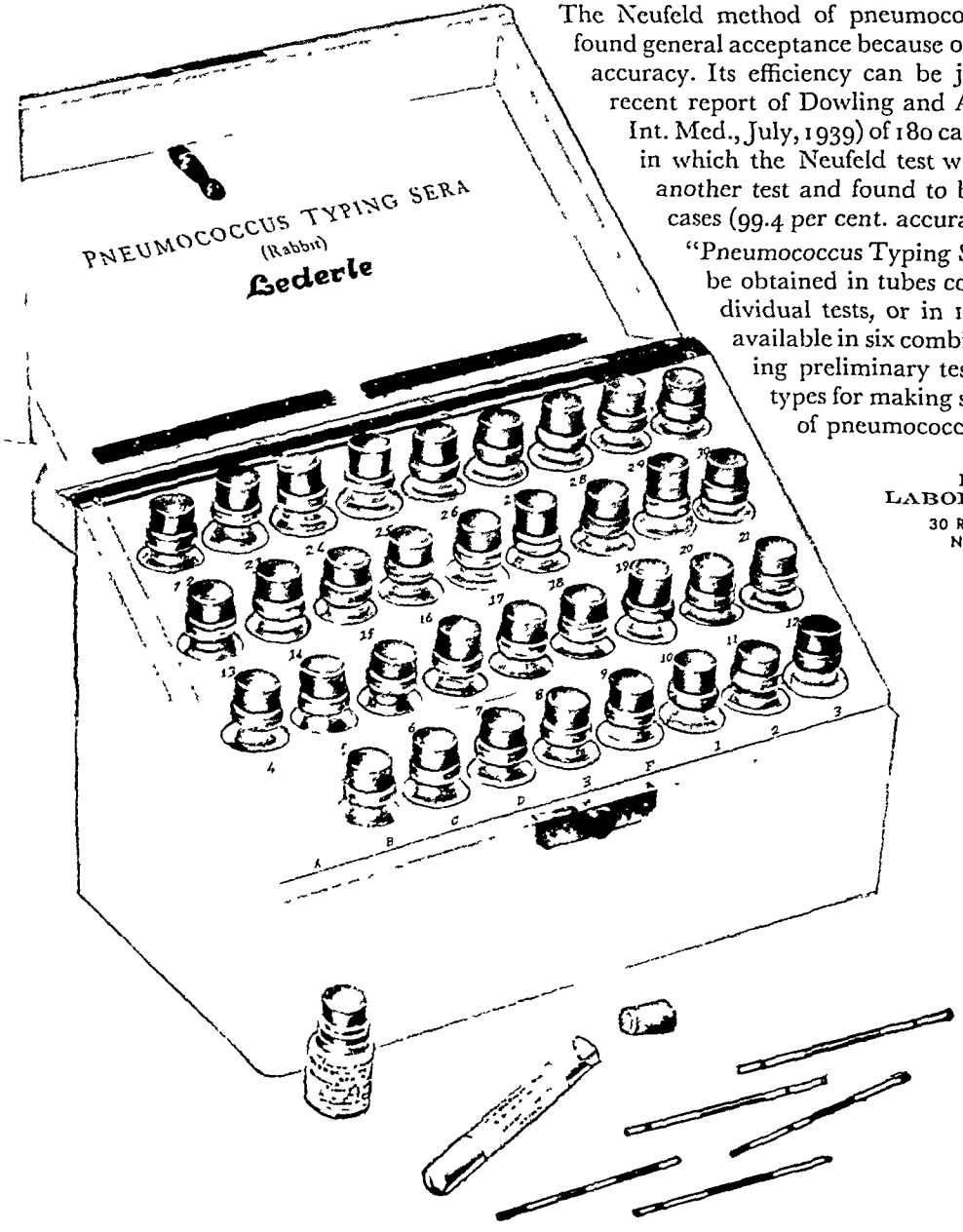
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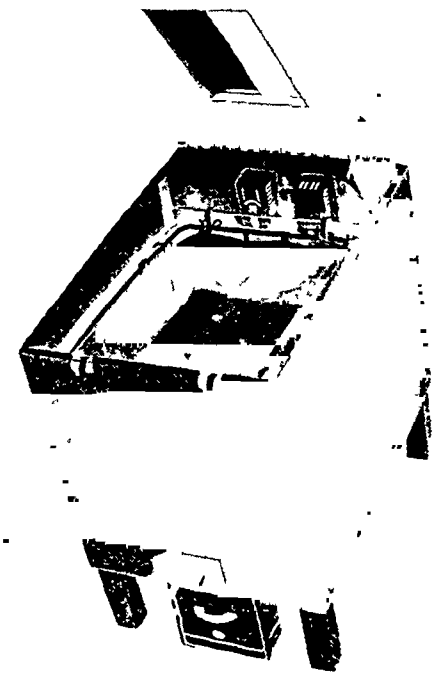
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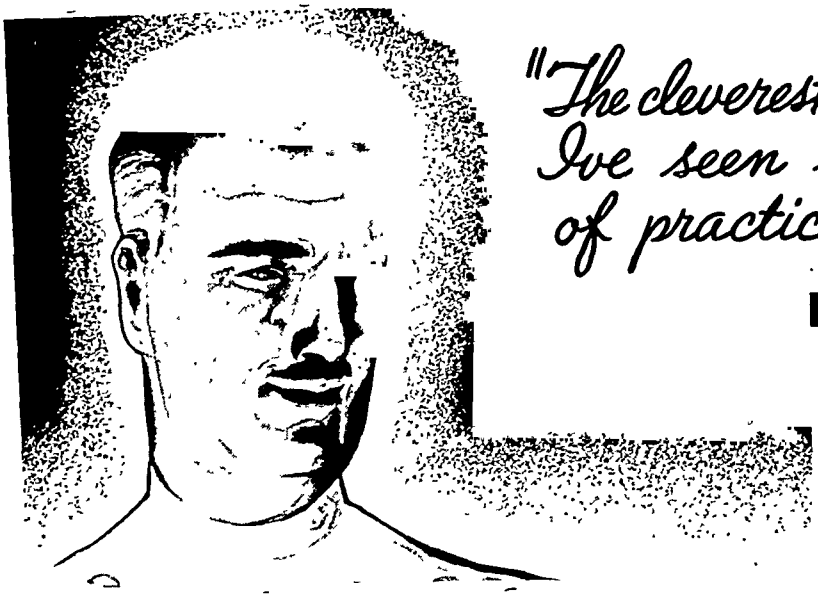
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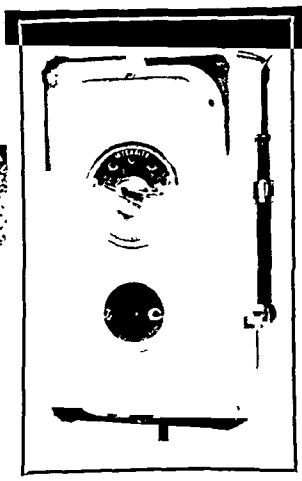
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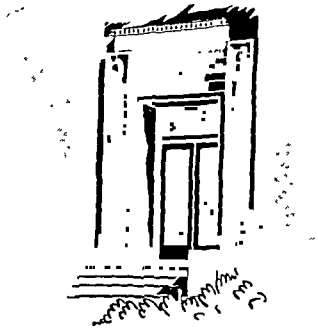
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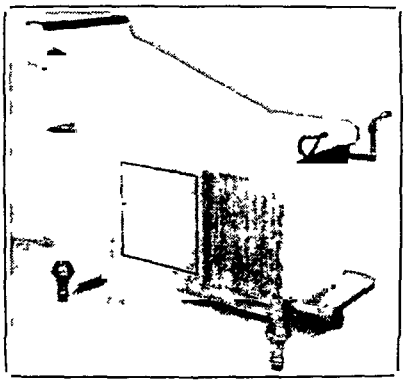
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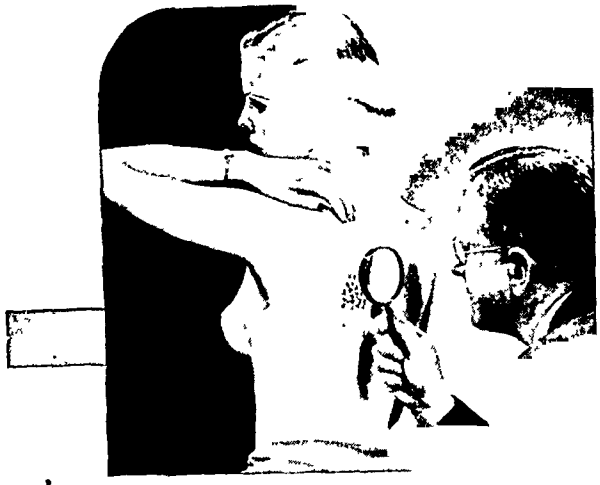


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The JOURNAL LANCET

Minneapolis, Minnesota
November, 1939

Vol. LIX, No. 11
New Series

The Fiftieth Anniversary of the Medical School of the University of Minnesota

Maurice B. Visscher, M.D., Ph.D.†
Minneapolis, Minnesota

THE occasion of the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota is an important one to the physicians of the Northwest. It represents a milestone in the progress of medicine on this scene. The quality of medical practice and the standards of medical education and research are intimately bound up one with another. When the publisher of THE JOURNAL-LANCET suggested that an issue of that organ be devoted to a summary of events of the celebration and a history of the medical school, because of their importance to northwestern medicine, the committee in charge of the celebration was pleased to respond. A medical school is not an independent entity, it is a part of the community and must serve the needs of that community if it has a right to exist. The medical school must be understood by the community, which is possible only if the medical profession as a whole is thoroughly acquainted with its work.

This account will be divided into three portions: the first will tell the more important facts about the history of the Medical School of the University of Minnesota. The second will comprise abstracts and quotations from the scientific papers bearing on the theme, "Chemistry in Medicine." The third section will be a report upon the public meetings held in connection with the celebration.

†Professor of physiology, University of Minnesota. Section II. written in collaboration with George O. Burr, Ph.D., Ancel Keys, Ph.D., W. P. Larson, M.D., Irvine McQuarrie, M.D., and Lee I. Smith, Ph.D.

I. The History of the Medical School

The half century mark seems to be an appropriate occasion to review the record of the past and take stock of the future. The Medical School of the University of Minnesota completed this year 50 years of service to the community. Its history has in many respects been an unusual one. Even some of the bare facts of requirements for admission, of size of staff, of material facilities in buildings and equipment and the content of the medical curriculum itself, tell a story.

The University of Minnesota began in a very modest way as a Land Grant college. A thumb-nail account of the founding and the general organization of the University from the early days is to be found in the official calendar for the year 1882-1883, prepared under the presidency of Dr. William W. Folwell and probably written by him. Because of the importance of the real situation in those early days and of the ideals of the pioneers, it is impossible to understand the subsequent course of events without knowledge of those times. The most realistic picture can be obtained by the contemporary description and therefore the following excerpt will be of interest:

EXCERPT FROM THE 1882 CALENDAR OF THE UNIVERSITY OF MINNESOTA

HISTORICAL

In the act creating the Territory of Minnesota, approved March 2, 1849, the Congress of the United States granted two townships of public lands for the endowment of a university. By an act approved February 9, 1851, two additional townships were granted for the same purpose.

The University practically dates its organization from the law of the State approved February 18, 1868, entitled "An Act to reorganize the University of Minnesota, and to establish an Agricultural College therein."

A preparatory department was opened in October, 1867. In 1869 the first faculty, consisting of a president and eight professors, was formed, and the first college class was organized. The first annual commencement was held June 19, 1873.

. . . . . .

The Legislature of 1881 appropriated the sum of $30,000 a year for six years for the erection and outfit of the following additional buildings: a farmhouse, a building for the College of Mechanic Arts, a military building, an astronomical observatory, a museum and a library.

The history of the Medical School of the University of Minnesota actually began with the year 1888 when all but one of the then existing colleges of medicine in the Twin Cities offered their charters and their properties to the Board of Regents of the University on the condition that the latter would set up and maintain a University School of Medicine. It would have been too much to expect that with its very limited funds the University could have caused to be born, full grown, a scientific institution fully equipped and staffed to undertake the difficult work of educating physicians. In the year of the founding of the Medical School, the faculty of the entire University comprised 98 members. A large proportion of these persons were part-time appointees. This number is to be contrasted with the 1500 full-time members of the faculty of the University of Minnesota in 1939, which figure does not account for the many hundreds of part-time appointments in the medical and other professional schools. In 1888 the Medical School had one full-time appointee, J. C. Bell, who was professor of chemistry.

The records of these early years are difficult of access but nevertheless important to a proper perspective. The founders of this medical school laid a ground work for progressive education. By comparison with present day standards their facilities and their requirements were low. It would be entirely unfair, however, to judge them on the basis of present-day standards. The quality of their work and the range of their vision can be judged fairly, only in the light of the conditions of their day. By that standard the Medical School of the University of Minnesota in 1888 stood as one of the leaders in progressive medical education. Its founders intended that it should be in the front ranks and if there is any single factor which is responsible for the calibre of the medical school today, it is the simple determination, on the part of leaders in medical education in the State of Minnesota, to make its medical school lead rather than follow the procession.

Again there could be no better way of sketching the real situation in 1888 than by reprinting the first announcement concerning medical education in the University of Minnesota. This statement appears as a description of work in the Department of Medicine in which there were three divisions, the College of Medicine and Surgery, the College of Homeopathic Medicine and Surgery, and the College of Dentistry. In order to provide a basis for comparison with present day situations, the contents of this announcement are quoted.

EXCERPT FROM THE UNIVERSITY CALENDAR FOR 1888

DEPARTMENT OF MEDICINE

Cyrus Northrop, LL.D. ..... President
Perry H. Millard, M.D. ..... Dean

This Department is composed of the following colleges, viz.: The College of Medicine and Surgery, the College of Homeopathic Medicine and Surgery, and the College of Dentistry.

HISTORICAL

The University of Minnesota, with all its departments, is located at St. Anthony Falls by a constitutional act. The original act, as adopted by the vote of the people of the territory in 1853, provided, among other departments, for a department of Medicine and Surgery. The Board of Regents established a College of Medicine and Surgery in 1882. The duties of the faculty were limited to the examination of applicants for the degrees of M.B. and M.D., and to the performance of work assigned to it by the legislature as "a State Board of Medical Examiners." This faculty, acting in its capacity as a board of examiners, secured the enactment of a new medical law in 1887, creating a new and independent board, to be appointed by the Governor; thus dispensing, to a great extent, with the necessity of its own further continuance.

On the 7th of April, 1887, a committee of the faculty waited upon the Board of Regents, in session at the capitol, and urged the propriety of establishing a teaching school of medicine with a high curriculum. This committee consisted of Drs. D. W. Hand, C. N. Hewitt and P. H. Millard, who made a written report exemplifying the necessity of, and the advantages to accrue from a high grade school. The question of establishing a department of medicine was referred to a special committee of the Board of Regents.

At a meeting of the Board of Regents, held February 28, 1888, a committee of the Boards of Trustees of the Minnesota Hospital College and of the St. Paul Medical School appeared and tendered the use of the properties of these schools to the State for medical college purposes. The leases of the property were offered the State for a period of five years, and the prop erty was accepted by the board.

In March, the Board of Trustees of the Minnesota Homeopathic Medical College also made a formal proposal to the Board of Regents to waive its charter as a college and cease to teach, provided Homeopathy should have a fair representation in the new medical department of the University. It offered also to provide such a place for the work of the Homeopathic faculty as the regents might require.

A committee, consisting of Dr. D. W. Hand, President of the State Board of Medical Examiners, Dr. Chas. F. McComb, President of the State Medical Society, Prof. Cyrus Northrop, President of the State University, and Dr. Perry H. Millard, Dean of the Medical Department of the University of Minnesota, was thereupon appointed by the Board with instructions to nominate a faculty for the College of Medicine and Surgery, and the College of Dentistry.

LOCATION

The University proper is located in East Minneapolis, corner of University and Fourteenth avenues S. E., but the lectures will be delivered and the laboratory work will be conducted at the buildings formerly occupied by the Minnesota Hospital College, corner of Sixth street and Ninth avenue South, near which point students should secure lodgings. The clinical instruction will be given at the various dispensaries and hospitals in both Minneapolis and St. Paul.

QUALIFICATIONS

Applicants for admisison to the College of Medicine and Surgery, the College of Homeopathic Medicine and Surgery, or the College of Dentistry will be required to prove their fitness to enter these colleges:

1. By writing legibly and correctly an English composition of not less than two hundred words.
2. By translation of easy Latin prose, or, in lieu thereof, by passing an examination upon one of the following subjects: French, German or one of the Scandinavian languages.
3. By passing an examination upon either the elements of Algebra, Plane Geometry, or Botany.
4. By showing such a knowledge of Physics as may be ob-

tained from the study of Gage's, Avery's, or Balfour Stewart's Elements of Physics.

It is provided, however, that no examination for admission shall be required of matriculants or graduates of any reputable college of Science, Literature and Arts; of graduates of State High Schools or Normal Schools; of persons holding a first-class teacher's certificate, or the certificate of the High School Board of the State of Minnesota.

COURSE

The curriculum in the department of Medicine covers a period of three years, each year of which represents a course of lectures of six months duration.

WINTER TERM

The course of lectures in this department will commence October 1, and will continue until the end of March. This is the essential part of the college year.

SPRING SESSION

A spring course will be conducted in each of the colleges, beginning April 1, at the close of the winter term, and extending over a period of nine weeks. Attendance upon this course is desirable, but is not obligatory. It is supplemental to the longer winter session, but cannot be regarded as a substitute or equivalent therefor.

DEGREES

In the department of medicine, the following degrees will be granted by the university:

To graduates of the College of Medicine and Surgery, the degree of Doctor of Medicine, (M.D.).

To graduates of the College of Homeopathic Medicine and Surgery, the degree of Doctor of Medicine, (M.D.).

To graduates of the College of Dentistry, the degree of Doctor of Dental Surgery, (D.D.S.).

Graduates of the College of Dentistry can obtain the degree of Doctor of Medicine by attending one full course of lectures in either of the allied colleges and by passing the final examinations required therein. Similarly, graduates of the College of Medicine and Surgery, or of the College of Homeopathy, can obtain the degree of Doctor of Dental Surgery by attending one full course of lectures in the College of Dentistry and by passing the final examinations in that college.

FEES

Students of the College of Medicine and Surgery, the College of Homeopathic Medicine and Surgery, and the College of Dentistry, will be uniformly charged as follows:

Matriculation fee, payable annually, for students who are residents of Minnesota, $10.00; for all others, $25.00.

Lecture courses, each year, for students of Minnesota, $25.00; for all others, $35.00.

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THE COLLEGE OF MEDICINE AND SURGERY

The Faculty

CYRUS NORTHROP, LL.D.
President

A. F. RITCHIE, M.D.
Professor of Anatomy

RICHARD O. BEARD, M.D.
Professor of Physiology

J. C. BELL
Professor of Chemistry

H. M. BRACKEN, M.D., L.R.C.S.E.
Professor of Materia Medica and Therapeutics

ALBERT E. SENKLER, M.D.
Professor of Theory and Practice of Medicine

CHARLES H. HUNTER, A.M., M.D.
Professor of Clinical Medicine and Pathology

EVERTON J. ABBOTT, A.B., M.D.
Professor of Clinical Medicine

CHARLES A. WHEATON, M.D.
Professor of Principles and Practice of Surgery

FREDERICK A. DUNSMOOR, M.D.
Professor of Clinical and Operative Surgery

PERRY H. MILLARD, M.D.
Dean and Professor of Clinical Surgery

PARKS RITCHIE, M.D.
Professor of Obstetrics

ALEX J. STONE, LL.D., M.D.
Professor of Diseases of Women

AMOS W. ABBOTT, M.D.
Clinical Professor of Diseases of Women

JOHN F. FULTON, Ph.D., M.D.
Professor of Ophthalmology and Otology

FRANK ALLPORT, M.D.
Clinical Professor of Ophthalmology and Otology

C. EUGENE RIGGS, A.M., M.D.
Professor of Diseases of the Nervous System

CHARLES H. BOARDMAN, M.D.
Professor of Medical Jurisprudence

ARTHUR B. ANCKER, M.D.
Professor of Hygiene

JAMES H. DUNN, M.D.
Professor of Diseases of the Genito-Urinary System

CHAS. L. WELLS, A.M., M.D.
Professor of Diseases of Children

JAMES E. MOORE, M.D.
Professor of Orthopaedic Surgery

M. P. VANDERHORCK, M.D.
Professor of Diseases of the Skin

W. S. LATON, M.D.
Professor of Diseases of the Throat and Nose

J. CLARK STEWART, B.S., M.D.
Professor of Histology and Bacteriology

J. W. BELL, M.D.
Professor of Physical Diagnosis and Diseases of the Chest

E. C. SPENCER, A.B., M.D.
Professor of Surgical Anatomy

A. B. CATES, A.M., M.D.
Adjunct Professor of Obstetrics

W. A. JONES, M.D.
Adjunct Professor of Diseases of the Nervous System

BURNSIDE FOSTER, M.D.
Demonstrator of Anatomy

COURSE OF INSTRUCTION

First Year: Anatomy, Chemistry, Histology, Physiology, Materia Medica, Laboratory Work.

Second Year: Continuation of first year studies, Pathology, Medical Jurisprudence, Theory and Practice, Clinical Medicine, Obstetrics, Diseases of Children, Physical Diagnosis, Hygiene, Surgery, Clinical Surgery, Gynecology, Clinical Instruction.

Third Year: Continuation of second year studies (without those of the first year), Neurology, Ophthalmology, Dermatology, Laryngology, Electro-therapy, Otology, Genito-Urinary Diseases, Orthopaedia, Clinical Instruction in all branches.

ANATOMY

Anatomy will be taught by lectures, dissections, under the demonstrator, and recitations.

Text Books—Gray's Anatomy and Holden's Landmarks.

Collateral Reading—Quain's Anatomy and Holden's Osteology.

PHYSIOLOGY

Lectures, practical demonstrations in the laboratory and recitations.

Text Books—Foster and Yeo.

Collateral Reading—Landois and Stirling and Chapman.

CHEMISTRY

Lectures in General and Organic Chemistry; laboratory course, including qualitative analysis, Toxicology and Urinalysis.

Text Books—Attfield, Green's Medical Chemistry.

Collateral Reading—Bowman, and Taylor on Poisons.

HISTOLOGY AND BACTERIOLOGY

Lectures and laboratory work. The student will be taught to mount normal tissues and specimens containing bacteria. The course in Normal Histology and Bacteriology will cover a period of not less than six weeks. If possible the student will provide himself with a microscope.

Text Books—Prudden's Practical Histology, Shaefer's Essential Histology.

Collateral Reading—Cornil and Ranvier.

PATHOLOGY

Pathology and Morbid Anatomy will be taught by lectures, recitations, and work in the dead house. The technique of the autopsy will be carefully dwelt upon so that each student can learn to make a careful post-mortem examination. Diseased processes will be illustrated by fresh and alcoholic specimens,

that theories of disease may be as much matters of demonstration as the nature of the subjects will admit.

Text Books—Delafield and Prudden, Cornil and Ranvier, Orth.

MATERIA MEDICA AND THERAPEUTICS

Lectures, practical demonstrations in the laboratory and recitations.

Text Books—Wood and Bartholow.

Collateral Reading—Mann.

OBSTETRICS

Lectures, illustrated by operations on the manakin, and recitations. During the senior year opportunities will be given members to attend cases of obstetrics.

Text Books—Lusk.

Collateral Reading—Playfair, Galabin, Charpentier.

SURGERY

Lectures and recitations; also clinical instruction, and special courses in minor surgery, bandaging, and operative surgery.

Text Books—Wyeth and Bryant.

Collateral Reading—Agnew, Ashhurst's International Encyclopaedia, and Erichsen.

PRACTICE OF MEDICINE

Lectures, recitations and clinical instruction. Bedside instruction will be a special feature in the teaching of this branch.

Text Books—Hilton Fagge.

Collateral Reading—Flint, Reynold's System, Loomis, Niemeyer, and Roberts.

DISEASES OF WOMEN

Lectures, clinical instruction and attendance upon operations. The opportunities of practical instruction in this branch will be very ample.

Text Books—Thomas, Schroeder, Byford.

Collateral Reading—Emmett and Hart and Barbour.

EYE AND EAR

Lectures, clinical instruction, and recitations.

Text Books—Nettleship (eye), Roosa (ear), and Williams.

Collateral Reading—Juler, Stellwag, Soelberg Wells and Politzer (ear).

DISEASES OF THE NERVOUS SYSTEM

Lectures and clinical instruction. Special opportunities will be afforded students in differential diagnosis.

Text Books—Gower's Nervous System, Bramwell (Cord), and Folsom (Insanity).

Collateral Reading—Ranney's Applied Anatomy of the Nervous System, Hammond's Diseases of the Nervous System, Bastian's Paralysis, and Clauston's Mental Diseases.

GENITO-URINARY DISEASES

Lectures and Clinical Instruction.

Text Books—Thompson's Diseases of the Urinary Organs.

Collateral Reading—Vanburen and Keyes, and Bumstead and Taylor.

DISEASES OF CHILDREN

Lectures, didactic and clinical in their character, will be given under this chair.

Text Books—J. Lewis Smith, Eustace Smith, Meigs and Pepper, and Goodhart.

DISEASES OF THE SKIN

Lectures and clinical instruction.

Text Book—Duhring.

Collateral Reading—Hyde and Van Haslingen.

LARYNGOLOGY

Lectures and the use of the Laryngoscope. Clinical instruction.

Text Book—McKenzie.

Collateral Reading—Bosworth.

PHYSICAL DIAGNOSIS

Lectures, class exercises, bedside instruction.

Text Book—Loomis.

Collateral Reading—Bramwell (heart).

ORTHOPAEDIC SURGERY

Lectures and clinics.

Text Book—Rums (Practical Orthopaedia).

Collateral Reading—McNamara and Gibney.

HYGIENE

Lectures.

Text Book—Parks.

Collateral Reading—Richardson's Preventive Medicine, Buck's Hygiene.

MEDICAL JURISPRUDENCE

Lectures.

Text Book—Taylor's Manual, by Ruse, last edition.

Collateral Reading—Taylor's Principles and Practice of Medical Jurisprudence.

The roster of the faculty of the Department of Medicine in 1888 is a list of names of persons whom we must thank for setting the stage for the drama which has followed. The period from 1888 to 1913 was a sort of prologue to the play itself. The scene was set and the main actors ready to be introduced. In 1913 a new president of the University, Dr. George E. Vincent, put in motion a plan whose theme embodies the first act of the historical drama we are reviewing. President Vincent had a vision of a medical school which would be the center in which a group of scholars would devote their full energies and activities to forwarding scientific research and teaching in medicine, supported by an able group of appointees from the active medical profession in the community. In the president's report to the Board of Regents for 1913 appears an account of the actions which prepared the way for the reorganized plan put into effect that year.

To the President of the University:

Sir: As Acting Dean during the last part of the school year, 1912-13, I beg to present to you the report of the Medical School for the year ending July 31, 1913.

Faculty—The Faculty records with regret the death, on February 2, 1913, of one of its original members, Dr. Parks Ritchie, who filled the chair of Obstetrics for twenty-five years, and the deanship of the College from 1897 to 1906. His long and faithful service commands the gratitude of the University and gives his name a fitting place in the annals of medical education in this State.

The school has suffered serious misfortune in the retirement of Dr. Frank Fairchild Wesbrook, who, on July 1, 1913, resigned the headship of the department which he had conducted for eighteen years, and the deanship which he had held for seven years, in order to accept the presidency of the University of British Columbia. His colleagues measure the enviable gain of the Canadian province by their sense of loss of his leaving, not only to the University of Minnesota, but to the interests of medical education and medical science in America. The vacancy he has left is no less keenly felt because his place has been fortunately filled.

On June 11, 1913, Elias Potter Lyon, Ph.D., M.D., was elected Dean of the Medical School to succeed Dean Wesbrook, and was also appointed Director of the Department of Physiology. The scientific work that Dean Lyon has already done testifies to his ability as an investigator, and the satisfactory results of his deanship in the St. Louis University Medical School promise much for his skill as an administrator. The Faculty anticipates a new era of progress under his leadership.

Reorganization—In the spring of 1913 the Board of Regents directed the reorganization of the College of Medicine and Surgery and appointed a committee, consisting of three members of the Medical Faculty, Dr. F. F. Wesbrook, Dr. Charles Lyman Greene, and Dr. James E. Moore, and of three alumni, Dr. Louis B. Wilson, Dr. Edward L. Tuohy, and Dr. Theodore Bratrud, charged with the duty of determining the principles of this reorganization. Their work, modified at certain points and approved by the President and by the Board of Regents may be briefly stated:

1. The title of the former College is changed to that of the Medical School.

2. The following titles, in ranking order, are established: (1) Professor and Chief (of clinical) or Director (of laboratory) Department; (2) Professor in charge of Division; (3) Associate Professor in charge of Division; (4) Associate Professor; (5) Assistant Professor; (6) Instructor; (7) Assistant.

3. Dr. C. Eugene Riggs, Dr. Thomas S. Roberts, and Dr. James T. Christison are named as Emeritus Professors.

4. The School is reorganized under eight departments, namely, the Department of Anatomy: Director, Clarence Martin Jackson, M.S., M.D.; the Department of Physiology: Director, Elias P. Lyon, Ph.D., M.D.; the Department of Pharmacology: Director, Arthur D. Hirschfelder, B.S., M.D.; the Department of Pathology and the Department of Bacteriology and Public Health (temporarily recombined): Acting Director, Dr. Harold E. Robertson, B.A., M.D.; the Department of Medicine: Chief, Charles Lyman Greene, M.D.; the Department of Surgery: Chief, James E. Moore, M.D.; the Department of Obstetrics: Chief, Jennings C. Litzenberg, B.S., M.D.; Diseases of the Eye, Ear, Nose, and Throat, Orthopedics, Dermatology, and Urology constitute Divisions of the Department of Surgery; Nervous and Mental Diseases and Pediatrics become Divisions of Medicine; and Gynecology is merged with Obstetrics and with Surgery.

5. The Faculty consists of eleven professors, eighteen associate professors, sixteen assistant professors, and twenty-five instructors; a total of seventy-one members, a substantial reduction from the former total of one hundred and eighty-four. Clinical and laboratory assistants, not accounted members of the Faculty, number thirty-two.

6. An Administrative Board, consisting of the President of the University, the Dean and the Secretary of the Medical School, the superintendent of hospitals, the directors or chiefs of departments, and of one member-elect from the Faculty at large, is charged with the immediate conduct of the affairs of the School. This body reports its official actions to the Faculty, which holds the privilege of review and advisory action.

7. Dr. R. O. Beard has been appointed Secretary of the Medical School. In addition to assisting the Dean in his administrative duties, he is given charge of the medical buildings and oversight of requisitions, of equipment and supply funds, and of the inventories of the School.

Respectfully submitted,

RICHARD OLDING BEARD, Secretary.

The reorganized school under its eight department directors cut the pattern which has been followed for the last twenty-five years. It was composed of a group of people who were qualified by training and experience to prosecute a program of scientific research and graduate education. There were many members of this group who had come to the University of Minnesota earlier and three new department heads were appointed in anatomy, physiology and pharmacology. At this time the program of graduate medical education which has become so large a part of the contribution of the University of Minnesota to medicine was begun. In the past twenty-five years some 1000 persons have been granted advanced degrees in the medical sciences by this University. The graduate teaching program in medicine has now become at least as important as the undergraduate one. During the past academic year there were about 450 students registered for work leading to the M.D. degree and about 600 working for graduate degrees in the medical sciences.

In working out this program, the leaders in the medical school seemed to foresee the increasing importance which intensive training in a branch of medical science would have. Today with the advent of special requirements for the practice of specialties, with the great need for trained investigators and teachers to carry on the forward work, it is much easier for us to see the wisdom in their plan. Many important centers of medical education are today embarking on programs begun at the University of Minnesota in 1913. There could be no more striking testimony to the soundness of the early Minnesota plan than has appeared in the course that events have taken in medicine during the last quarter century.

The University of Minnesota Medical School has been first in another forward step. Beginning with those persons receiving their M.D. degrees in 1916, a fifth, or internship year, was made a requirement for that degree. Recognizing that the increase in scientific content of medical education both forced clinical teaching out of the early years of the medical course and added to the desirable content of the clinical courses, it became necessary to extend practical clinical work beyond the conventional four years of the medical course. Thus could physicians be better prepared scientifically without being more poorly prepared practically. There are many flaws in internship training. Outside of teaching centers there is frequently too little attention paid to the teaching aspects of an internship. There are, of course, many notable exceptions to this rule. In spite of the poor quality, however, of a certain number of internships, the establishment of the tradition that Minnesota graduates in medicine shall serve a sort of practical apprenticeship after their more formal training is completed, has served to raise the quality of medical practice in this region.

In order to visualize the changes which have taken place in the method of educating physicians, it is of interest to compare the requirements for admission and other details of the educational program at the University of Minnesota today with the situation evident from the description of 1888. Some excerpts from the 1939 *Bulletin* of the Medical School follow.

REQUIREMENTS FOR ADMISSION

The minimum requirements for admission to the Medical School are three full years of work in colleges approved by the Association of American Universities, and including the specific courses listed below.

A candidate's record must show a total number of honor points at least equal to the total number of credits both in the required subjects and in all subjects taken collectively. This is equivalent to a "C" average in the usual marking systems.

Mere fulfillment of the minimum scholastic requirements does not in itself insure admission to the Medical School.

DETAILS OF REQUIREMENTS

1. *Chemistry.*—Thirty-two credits including general inorganic chemistry, qualitative and quantitative analysis, organic and physical chemistry, with laboratory work.

2. *Zoology.*—Thirteen credits, including proper laboratory work.

3. *Physics.*—Twelve credits, covering mechanics, acoustics, heat, optics, and electricity.

4. *Rhetoric.*—Nine credits. No student found deficient in the use of written or spoken English will be permitted to enter upon or to continue in the medical course.

5. *Psychology.*—Six credits of general psychology.

10. *Academic degree.*—The degree of bachelor of arts or bachelor of science must be acquired by all medical students before registering for the junior year.

RECOMMENDED PREMEDICAL WORK

While it is possible to secure admission to the Medical School after the minimum amount of prescribed college work has been completed, the applicant is urged to prepare himself more fully by the study of some of the following subjects.

Sociology (especially Social Pathology), zoology (Introduction to Animal Parasitology), agricultural biochemistry, anthropology, astronomy, botany, composition, drawing, economics, English, geography, geology, history, mathematics, personal

health, philosophy, physics, political science, psychology and speech.

A list of recommended courses is available in the dean's office. Four years of premedical study are desirable; the work should be planned so as to lead to an academic degree if four years are taken.

The curriculum in liberal arts intended for those who wish to get a broader view of the fields of knowledge ("second curriculum" in the bulletin of the College of Science, Literature, and the Arts) is recommended to premedical students who wish to secure an academic degree without majoring in a special field.

CURRICULUM

CURRICULUM FOR THE DEGREE OF BACHELOR OF MEDICINE

Optional Courses of Study

Candidates may:

a. Pursue the regular curriculum outlined below, or

b. Follow the regular curriculum with modifications in the direction of special work in some particular department Such students with the written consent of the dean of the Medical School may register during certain quarters in the Graduate School; and such registration, if major work is done in a Medical School department, may be transferred later to the Medical School to count toward a medical degree. Such students may qualify for advanced degrees such as M S. and Ph.D

REGULAR CURRICULUM

Departmental Hours	Clock Hours
Anatomy, gross and microscopic	693
Bacteriology	176
Medicine	987
Obstetrics	411
Ophthalmology and Otolaryngology	108
Pathology	396
Pediatrics	330
Pharmacology	176
Physiology, including Physiological Chemistry and Biophysics	462
Preventive Medicine and Public Health	86
Roentgenology	59
Surgery	581
Total	4,465

It will be noted that in place of the dubiously worded requirement of a high school diploma in 1888, at the present time a prospective medical student must present evidence of completion of at least three years work of approved collegiate grade including both a certain minimum of scientific background in physics, chemistry and biology, and also a fair background in the more conventional liberal arts courses with emphasis upon sociology, history and languages.

Just as 50 years ago the University of Minnesota was taking the lead in setting up improved standards of scientific qualification, so at the present time this University, among others, is attempting to arrange its curriculum in such a way, that its graduates in medicine will be cultured persons in a broad sense, as well as highly trained students of medicine. The era of specialization has shown the undesirability of confining college training for premedical students to the strictly technical prerequisites in the sciences. In order to maintain the position of the profession of medicine in the high place in the community which it holds, it is essential that physicians understand as well as other cultured people the complex problems which our urban and industrial civilizations have thrust upon us. Such an understanding requires a breadth of training and is perhaps the main reason why increasing the years of premedical study from two to three has been found to be desirable.

The Medical School of the University of Minnesota has been supported largely by state appropriations, but the extent to which it has been assisted by private grants is not generally known. Actually a total of more than $4,500,000 has come in special gifts. Chief among these have been the following special gifts: from the wife of Dr. Adolphus E. Elliot, a gift for the construction of the Elliot Memorial Hospital; from William Henry Eustis a gift for the construction and endowment of a Children's Hospital and Convalescent Home; from the Citizens Aid Society a gift for the construction, equipment and operation of the Cancer Institute; from the widow of Dr. Frank C. Todd, from Mrs. E. C. Gale and from Mrs. L. E. Mapes a gift for the construction of the Todd Memorial Eye, Ear, Nose and Throat Hospital; from the James E. Moore and Howard Baker estates funds for use in the Department of Surgery; from the estate of Dr. George G. Eitel a fund which will become available as a loan fund for medical students; from the trustees of the Stevens Avenue Home for Children and Aged Women a grant for the operation of the Psychiatric Clinic for Children in addition to a grant from the Commonwealth Fund; from Mr. and Mrs. Hayden S. Cole a gift for the establishment of fellowships in Orthopedic Surgery; from the Barber Oil Company a gift for research in cancer; from Mrs. John Dwan a gift for the establishment of a Human Serum Laboratory; from the Commonwealth Fund a grant for the support of Postgraduate Medical Education; from the Rockefeller Foundation a grant for research in physiology; and from the Carnegie Institute of Washington a grant for research on viruses.

The larger share of the clinical facilities on the university campus have been provided out of private funds. These benefactions all constitute investments which public-minded citizens have made for the welfare of mankind.

The important contributions of the medical school are written in two ledgers. In the one, appear its achievements in the training of men and women to render practical medical service to the community. In the other, appear the contributions to the permanent fund of basic knowledge which represents the advance of a stable sort. On both of these ledgers, the University of Minnesota has written a good account. Its more than three thousand graduates have served their generations well, both in the rendering of practical service and in the promotion of knowledge. It would be impossible to list the specific research accomplishments, but in such widely diversified fields as growth and intestinal obstruction, as sewage disposal and vitamin research, the University of Minnesota has left lasting contributions from its first fifty years of service, contributions, the value of which has already exceeded by many times the whole cost of the medical school, and the dividends from which will continue to return as long as the human race shall live.

II. The Scientific Program of the Semi-Centennial Celebration

In planning the scientific program the committee in charge chose a theme which they believed would symbolize the advance of medicine over the past fifty years and would point the way that progress may be expected to take in the immediate future. Among the several general themes which might obviously suggest themselves, the topic, "Some Trends in Medical Progress with Particular Reference to Chemistry in Medicine," was chosen. Fifteen papers bearing on this general topic were presented on October 12 and 13, 1939.

In addition, on October 14, six anniversary clinics were presented by members of the staff of the University of Minnesota, at the Mayo Foundation and in the Medical School at the University.

Abstracts of the scientific papers follow.

A. PROGRESS IN THE APPLICATION OF PHYSICAL CHEMISTRY TO MEDICINE

Presiding: GEORGE E. FAHR
Professor of Medicine, University of Minnesota

Colloid Chemistry of Membranes in Living Organisms

HERBERT M. FREUNDLICH
Distinguished Service Professor, University of Minnesota

Dr. Freundlich pointed out the important role that membranes play in biological processes and stated that, for the most part, physical chemists had been only slightly interested in membranes. This is probably true because membranes introduce annoying complications in physical chemical systems.

"Membranes set up barriers. In a limiting case they may be strictly semipermeable, allowing the solvent to pass, but preventing the solute from doing so. Very many intermediate cases, however, are possible and known. If a membrane separates two solutions containing substances which would react with each other, it prevents the straightforward reaction that would go on in a homogeneous solution and it may cause an involved series of processes depending on the special permeability of the membrane. This permeability may be very complex: all substances present may be able to pass the membrane, but with very different velocities; the membrane may be asymmetrical, allowing a substance to pass easily from the one side, difficultly from the other; or it may be permeable to cations from the one side, to anions from the other, etc. This complex behavior is fully realized by biologists, when treating natural membranes."

Professor Freundlich discussed the mechanism of abnormal osmosis, that is the movement of water as a result of other forces than simple passive osmosis. He described electro-chemical phenomena which are capable of producing such movement as a consequence of the existence of concentration gradients of salts on the two sides of membranes which are made up of pores of different characteristics. The latter type of membrane is referred to as a mosaic. The simple diameter of a pore in the membrane is able to determine, other things being equal, what materials may pass through. Very small pores with an electric charge on their walls permit ions of only one sign to pass. This restriction to passage for ions of the same sign sets up large electrical forces which are able to do work.

Professor Freundlich also discussed other types of abnormal osmosis. "With membranes that are able to swell, abnormal and particularly negative osmosis may be produced by an other mechanism, namely by differences in the rate of swelling, as was shown by Flusin. If a rubber membrane separates two liquids in which it swells with different velocity, e. g. benzene and alcohol, the liquid is transported osmotically through the membrane from that side of the latter which swells more quickly, i. e. from the benzene side. In these experiments the rubber membrane must be prevented from bulging out by pressing it between two nettings of this wire. The same holds, if we are dealing with a membrane like pig's bladder between water and an aqueous solution: if the aqueous solution, e. g. one of tartaric acid, causes the membrane to swell more quickly than in water, the transport liquid goes from the acid solution to the pure water, i. e. we have a negative osmosis. This behavior of pig's bladder between water and an aqueous solution of an organic acid was already observed by Dutrochet. This phenomenon has not yet been investigated very thoroughly. In particular, only Bartell seems to have discussed the question, how the behavior of membranes that are able to swell may be correlated to that of non-swelling membranes as it was treated above.

Finally, another group of phenomena may be briefly discussed, which are also able to cause a special distribution of substances across a membrane differing from that produced by normal osmosis. They are not bound strictly to the presence of membranes, but they are strongly enhanced by them.

We may start from the simple Donnan equilibrium: a solution of a colloidal electrolyte, i. e. of an electrolyte having one very large ion, like congo red, on the one side of a membrane which is impermeable to the colloidal ion, and a true solution, like one of NaCl, on the other side. In equilibrium the NaCl is not distributed equally on both sides; the presence of the colloidal ion allows only a comparatively small amount of NaCl to pass to the other side. This Donnan effect is an example of a very general phenomenon, as was emphasized first by G. Spencer Hartley. If a liquid solution is in a field of force which is not uniform, the dissolved substance does not remain in uniform distribution throughout the liquid, but also becomes distributed non-uniformly. We need not be dealing with a state of equilibrium; it also may be a stationary state or a temporary state only kept up, as long as the gradient of force is sufficiently steep. The simplest phenomenon of this kind is perhaps the Ludwig Soret effect: If a column of a solution, having at the outset a uniform concentration, is kept warm on the one end, cold on the other, the concentration of solute on the warm end becomes different from that on the cold end. It was believed that this phenomenon could be explained simply by van't Hoff's conception of solutions. Assuming that the osmotic pressure would have to be equal throughout the column, one might expect that the increase of osmotic pressure caused by the higher temperature would be compensated by a corresponding decrease in concentration. This theory, however, did not agree with the experiments. Not only the molecules of the solute migrate under the influence of the temperature gradient, but also the molecules of the solvent. The process depends on their mutual affinity, and it is, therefore, correlated in a still

unknown way to the solubility of the solute and the temperature coefficient of its solubility.

At constant temperature, the presence of a second substance which is not uniformly distributed, but which has a concentration gradient, is sufficient to produce a non-uniform field of force. The concentration gradient of the second solute causes an unequal distribution of the first solute, which originally was uniformly distributed. This phenomenon is known as anomalous diffusion or 'diffusion retrograde'."

Professor Freundlich closed his paper with the following thoughts. "It is distinctive of life that it is a stationary state of chemical and physico-chemical processes at a distance from equilibrium. Life is also, as it were, a very long, if we consider propagation, a practically eternal interlude. Membranes favor interludes strongly interrupting the straightforward course of reactions. It is another characteristic feature of biological processes that they do not occur, as a rule, in homogeneous solutions, but that chemical reactions are of necessity closely correlated to the existence of a special structure in space. Membranes favor a particular distribution of substances in space, they underline, so to say, a geometrical factor. These facts form perhaps the essential part of the influence which membranes bring to bear upon biological processes."

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The Performance of Osmotic Work in Living Systems

MAURICE B. VISSCHER
Professor of Physiology, University of Minnesota

Living systems may be described from a physico-chemical point of view as systems maintained at a steady state at positions far from true equilibrium. The physiologist, Claude Bernard, recognized this fact when he stated the law of constancy of the *milieu interieur* or internal environment as a condition of life. Cannon's concept of homeostasis puts the same idea forward as a unifying principle in physiology.

In chemical systems such as one finds in a living organism, the maintenance of a steady state at some distance from the position of true reversible equilibrium can be accomplished only by the continuous expenditure of energy. There are many aspects of the problem of steady states important to biology but I shall confine myself strictly to observations concerning the osmotic activity of living systems.

In order to point out that osmotic work is of more than academic interest I shall mention briefly some applications. From a medical point of view the most conspicuous example is the secretion of urine. The kidney has the largest responsibility for maintaining osmotic constancy in mammalian forms. In lower vertebrate forms, as Keys has shown, this function is handled mainly by certain specialized structures in the gills. In mammals, the kidney is capable of concentrating substances a hundredfold in urine as compared with blood, and it can secrete urine with an osmotic pressure as much as twenty atmospheres greater than that of plasma. Moreover, it is the concentration of individual constituents rather than the over-all osmotic pressure which is of the highest importance.

The selectivity with which the kidney does work must be emphasized. From a practical point of view the clinician is mainly interested in the pathological physiology of the kidney, and is therefore concerned with those conditions in which the kidney fails to do selective osmotic work in a normal manner. Analyzed broadly in physico-chemical terms a renal insufficiency constitutes such a failure. Specifically this defect may result from the anatomical destruction of certain units, or it may be the result of chemical changes in the cells of the kidney tubules which leave no visible microscopic sign.

It might seem to be of no great consequence to know that when a large proportion of glomerular and tubular units in a kidney are destroyed, as in glomerulo-nephritis, the essential functional pathology is in the osmotic work mechanism. It might seem that since the damage is obviously structural in a microscopic or even a gross anatomic sense, the resultant functional defect would be so obvious as not to require study. Actually, however, this is not true. The kidney, like other organs, has a large margin of safety in its capacity to do work, and a large fraction, even a major portion, of its mass can be destroyed or removed without impairment of function except under extreme conditions. It is the business of the physician to assess the degree of functional damage by studying the limits of capacity to do osmotic work and to govern the treatment of his patient accordingly. Every renal function test represents fundamentally a measure of the ability of the renal mechanism to perform osmotic work. The dilution-concentration tests, the various clearance measurements and the dye excretion methods, all involve estimations of the ability to do certain types of osmotic work.

In other disease states the ability of the kidney to do osmotic work is impaired without obvious renal histo-pathology, as for example in adrenal cortical insufficiency, where the concentrating power of the kidney tubules for numerous urinary constituents is much reduced. The defect of the kidney tubules in this disease may be shared by other cells in the body, for all active cells probably do work to maintain the normal distribution ratios between intra and extra cellular fluids. It is not impossible that in adrenal insufficiency the body cells generally are less able to do the osmotic work by which they maintain their individual chemical characteristics.

Over the last several years, my research associates and I have been engaged in investigations concerning the circumstances surrounding the performance of osmotic work in living systems. We have studied a number of gland secretory processes and the maintenance of concentration differences between cells and tissue fluids, but we have devoted our main attention to absorption from the intestine. Intestinal absorption has in the past been considered generally to involve mainly passive processes, but it is now obvious that, although passive processes also take place, a very important part of intestinal absorption occurs against concentration gradients and that osmotic work is done in such movement.

The lower ileum can be made to do osmotic work which is qualitatively and quantitatively somewhat similar to that done by the renal tubules. The intestine offers important advantages for investigation over the kidney tubule because it is a macroscopic rather than a microscopic organ and therefore lends itself better to investigation. Although the mechanism by which the intestine performs osmotic work is important in its own right, the main objective of our studies has been to discover whatever empirical regularities may be found with the expectation that the fundamental mechanisms are apt to be similar in comparable situations elsewhere in living systems.

We have studied in detail concentration and volume changes in active absorption. Complete balances have been calculated in order to eliminate the possibility of simple ion exchanges. The influences of numerous factors, such as H^+ anesthetics and poisons, species of animal and level of the small intestine have all been studied. The movement of water has been investigated by the use of D_2O, by the study of total osmotic activity, as well as by volume measurements. We have determined the hydrostatic pressures in the gut during absorption to rule out simple filtration processes. The absorption of the animal's blood serum introduced into the intestinal loop has been studied in order to set up conditions in which all concentrations are identical on the blood and intestinal lumen sides of the gut wall. The absorption of a wide variety of substances moving both against and with diffusion gradients has been studied.

The main results of this work show that in the presence of di-valent ion salts such as sodium sulfate, the simple uni-valent ion salts such as sodium chloride are moved out of the intestine against concentration gradients, a phenomenon which could not occur without the performance of work. It has been shown that during absorption from the intestine, fluid enters it from the blood even while fluid is also leaving to the blood. Various studies have shown the probable existence of what has been called the fluid circuit which is driven by some force which has not been identified. In this movement fluid moves through at least two membranes the permeability characteristics of which can account for the distribution of materials which is observed. The existence of such fluid circuits has been shown to occur in other living systems. For example, protozoans such as Amoeba proteus, and Parameacium caudatum rhythmically discharge from their contractile vacuoles quantities of fluid equal to as much as their cell volume in one hour. This process occurs continuously throughout the life of the organisms. As they do not lose volume it is obvious that an equal quantity of fluid is entering the organisms through other parts of the cell surface. Krogh (1939) concludes that nearly pure water must be excreted by the vacuole. The work that must be done by these organisms can readily be calculated, and it is found to be very large. The ability to perform such work has been found to be abolished by cyanide. According to Müller and others this process serves an osmoregulatory function.

It is not germane to my argument to insist upon the mechanism by which the contractile vacuole operates. I am content to rest on the simple observation that quantities of fluid equal to the volume of the entire organism pass from the external medium into the cell and out again through the vacuole as rapidly as once per hour. Here is obviously a fluid circuit in a very simple system. If osmotic work is done in the process the situation approximates the one under consideration in mammals even more closely, but that point is not crucial.

I should like to refer to another system in which osmotic work is known to be done and a kind of fluid circuit is known to exist, although in its simplest form it is not known to do all of the osmotic work. I refer to the vertebrate kidney itself. We know, on the basis of the work of numerous investigators, that a large volume of fluid is filtered through the glomerular capsules, a quantity about equal to the entire blood volume every hour. Ordinarily 99 per cent of this fluid returns to the blood in the course of its passage along the renal tubules. The high concentration of such substances as urea and creatinine in the urine is generally conceived to be due to the impermeability of the tubular epithelium to these substances. The reason for such impermeability and the mechanism by which the water is returned to the blood are unsolved problems, but the fact of a fluid circulation equal in volume to about a hundred times the eventual urine volume is not open to serious question.

It would not be strange if one were to find this mechanism, seen in the case of the most primitive animal forms and in the most highly specialized organ, present in nature for the performance of selective osmotic work, employed generally in accomplishing such work.

At the present time any such theory must be entirely tentative, in spite of the fact that by its application one can account for a number of otherwise inexplicable facts. A theoretical approach is nevertheless extremely desirable regardless of how tentative it must be, because only the most random kind of exploration is possible without some theoretical thesis to test. A reasonable groundwork of hypothesis in any science spares workers in that science from being mere "pebble pickers," as some prominent critics of the scientific method have called them. Reasonable theories give point to investigation just as long as hypothesis is in accord with fact. When clear contradictions exist the hypothesis must be abandoned or altered.

Nowhere, perhaps, more than in the problem of the mechanism of performance of osmotic work is a theoretical background necessary to progress. The *a priori* possibilities of mechanisms are extremely numerous, but the mechanisms which are compatible with known fact are few. It is inevitable that by setting up critical experiments testing these several possible mechanisms progress can be made toward the more complete solution of this fundamental problem.

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Some Reactions by Which Solutes May Be Differentially Concentrated by the Kidney

JOHN P. PETERS
Professor of Medicine, Yale University

Dr. Peters began his discussion with some observations on unexpected peculiarities in the distribution of substances between the red blood cells and the plasma and between protein containing solutions and their ultrafiltrates.

"The red blood cells lend themselves to a study of this process because they can be separated from their environment, the plasma, so that the compositions of both media can be determined by direct analysis. All of you are familiar with the striking differences between them. Proteins are more concentrated within the cell; only glucose, urea and other neutral organic solutes of small molecular size are evenly distributed. Potassium is the chief inorganic base in the cells, sodium in the serum; calcium is almost excluded from the cells which contain more magnesium than the serum. Bicarbonate and chloride are far more concentrated in serum than cells; the cells contain large quantities of organic phosphate esters that are almost entirely lacking in serum. In the test tube, so long as the cells are properly treated, it is impossible to alter their composition by adding the most diverse inorganic solutions. They respond merely by exchanges of water, so regulated that the osmotic pressures on the two sides of the membrane remain always identical. This has been demonstrated by additions to the blood of water and of carbonates, chlorides, sulfates and phosphates of both sodium and potassium. Such experiments have been cited as evidence that the membranes of the red blood cells are impermeable to inorganic bases and to most acids. From indirect evidence of various kinds it has been deduced that most of the cells in the body behave in a similar manner. It is quite obvious, however, that if cells are to function they must have access to the materials essential to their activities, among which belong potassium, magnesium and phosphate. Their impermeability to these elements must, therefore, be conditions.

When experiments similar to those just described were attempted *in vivo* by examining the blood of patients before and after the administration of large amounts of hypertonic salt solutions, a peculiar paradox presented itself. Again the volumes of the red blood cells varied directly in proportion to the base of serum. On the other hand, chemical analyses revealed unmistakably that the base in the cells had changed. In the circulating blood in the living subject, then, the impermeability of the cell envelope to base is not absolute. Moreover, base can enter or leave the cell without, apparently, altering osmotic pressure. This base must be osmotically inactive. Now there were certain facts that might have led us to anticipate this paradox. In the first place it had been discovered that the correlation between water and base in cells was extremely rough. In the second place the correlation between the concentrations of base in serum and cells was also poor, the base in the latter being far more variable. In connection with other cells it had been demonstrated by Harrison and Darrow that after adrenalectomy the cells retained or took on potassium without an equivalent amount of water. Nevertheless, in this condition the cells responded in the usual manner to changes of the osmotic pressure and base concentrations of serum. It was recognized

that potassium, magnesium, inorganic phosphate and organic phosphate esters played particular individual roles in the metabolic activities of the cells. This suggested that they had certain selective chemical affinities. Magnesium and phosphate esters performed their functions by chemical reactions in which certain proteins participated as coenzymes. It was reasonable to suppose, then, that these inorganic components and proteins formed combinations in the course of the reactions.

The problems which confronted us at this point were: first, to find conditions by which base could be driven across the red blood cell membrane in the test tube; second to ascertain the state—or, if you will, activity—of the inorganic components of the cells. In neither effort have we been entirely successful, but we have some suggestive results. In describing the *in vitro* experiments above I was careful to state that the red cells, if properly treated, were impervious to bases and to the acids enumerated. Proper treatment consisted of keeping them in the cold for purposes of preservation. Of course this also held metabolic processes in abeyance. With this thought in view Dr. Lena Halpern tested the reactions of the cells at incubator temperature, studying, however, the behavior of inorganic phosphate rather than base. She discovered that although, at refrigerator temperature, no inorganic phosphate could be driven across the membrane in either direction by extreme alterations of its concentration in serum, at incubator temperature the inorganic phosphate derived from hydrolysis of organic esters poured out of the cells even against a concentration gradient produced by the addition of inorganic phosphate to the serum. Obviously the cell membrane was not dead or such concentration gradients would not be maintained. But to make assurance doubly sure it was proved that the current of inorganic phosphate could be reversed by the addition to the system of glucose, which also reversed the direction of the metabolic processes, causing phosphate esters to be reformed at the expense of inorganic phosphate.

These facts are interesting enough, but it is certain of their implications that I wish to emphasize. When this cell was at rest in the cold it acted like a perfectly inert osmometer, impervious to all the substances that give it its specialized properties, responding passively to osmotic changes in its environment by taking on or giving up water. But how could it do otherwise and maintain its integrity without the expenditure of energy? The mere maintenance of differentiation, in the absence of the mysterious restraints that we label impermeability, would be an impossibility without continuous work. When metabolic activity begins it brings with it demands for new materials and changes in the chemical internal environment; but it also provides the energy by which these changes can be effected without dissolution of that environment. Phosphates could move across that red cell membrane, when the cell was active, against the force of osmotic pressure. They were secreted by the cell, presumably by the force engendered by these metabolic activities."

In connection with the work of concentration by the kidney, Doctor Peters called attention to an important fact, that the most important aspect of the work of the kidney is in the differential concentration of various separate substances. The work that is represented simply by the difference in osmotic pressure or the depression of freezing point of urine as compared with blood, is not by any means an adequate measure of the work the kidney does. Each individual constituent must be taken into account in order to measure such work. Doctor Peters described experiments in which the excretion of sulfate in the urine was studied after intravenous injection of solutions of various sulfates. The results showed a surprising dependence of the rate of excretion upon the concentration in the plasma. It was pointed out that although sulfate was ordinarily classed as a non-threshold substance, in reality it is not. He distinguishes between exogenous and endogenous sulfates.

"The important fact is that, if exogenous sulfate enters the serum, as its concentration in the serum rises the excess of sulfate is excreted far more rapidly than is the native or endogenous sulfate, and apparently according to a different principle. The rate of excretion of the extra sulfate bears a definite relation to its concentration in the serum. Whether endogenous excesses of sulfate would be treated in the same way is difficult, if not impossible, to determine because the breaks in the clearance curves occur at serum concentrations that are encountered in life not at all or only when renal function is profoundly impaired. The temptation is strong to conjecture that the sharp breaks in the directions of the clearance curves are determined not by some critical concentration of sulfate in the serum, but by the fact that sulfate in some unusual form has gained access to the tubular urine. The subject takes on more importance in the light of other experiments which indicate that phosphate, chloride, sodium, potassium, calcium and magnesium can all be shown to behave in a similar manner if the experimental stage is so set that confusing factors are excluded."

B. SOME RECENT ADVANCES IN METABOLISM

Presiding: CLARENCE M. JACKSON

Professor of Anatomy, University of Minnesota

Organic Chemistry in the Pursuit of Vitamin Research

LEE I. SMITH

Professor of Organic Chemistry
University of Minnesota

Dr. Smith pointed out that in the field of vitamins and hormones, one is dealing with chemical substances which exert profound biological effects by their presence in very minute amounts. These substances might be called "bio-catalysts." The problem in vitamin research is that of discovering, by means of carefully controlled experiments, the nature of a substance which is causing a given effect by its presence in extremely small amounts. Since such substances are organic in nature, and their effects are biological, it requires the combined efforts of biologists and chemists to solve the problems involved. In no other field perhaps has there been such an absolute necessity for coöperative efforts in research. Stages in the study and elucidation of the nature of a vitamin and of its biological actions according to Dr. Smith may be counted roughly as five. There are: (1) Recognizing a biological effect which can be traced to a lack of something in the "high purified" diet used. (2) Using a process of selective elimination, the substance whose lack is responsible for the biological effect is located in one or more of the dietary components, and a foodstuff is sought which is particularly rich in the unknown substance. The foodstuff rich in the unknown is processed in various ways and concentrates are obtained. Frequently studies made with active concentrates yield a great deal of information about the substance chemically. (3) Physical and chemical methods are used to study the concentrates, and a criterion is sought by means of which the active substance may be determined rapidly without waiting for the bio assays. Concentrates are further worked over, and very active ones finally obtained. The active substance is finally isolated and its composition established by analysis. (4) Methods of organic chemistry are next applied to determine the character of the substance and to synthesize it. (5) The final stage may be said to be endless; it consists in a further chemical search for substances with the same action, and physiological and clinical studies of its mode of action.

Dr. Smith recalled the history of vitamin E research. In 1922, Evans and Bishop at California, described the results of a series of experiments which indicated that there was hitherto an unknown dietary constituent necessary for normal reproduction. This was seen as a new vitamin, and at first there was some hesitancy in accepting another member of the vitamin family. But from various laboratories came convincing evidence, and it was soon well established that rats, reared on diets otherwise complete, but not containing this new fat soluble factor, did not have offspring although they appeared quite normal in other respects. Male animals became sterile through degeneration of the germinal epithelium, and this damage was irreparable. Females failed to carry their young to term; the embryos died and were absorbed, but the female reproductive mechanism as such was not permanently damaged since adequate doses of the missing factor restored fertility. However, over long periods of time there is some permanent damage to the female organism. Still other experiments showed that diets in which this factor, though originally present, had been destroyed by oxidation, were likewise inadequate for reproduction. And so the substance X became vitamin E.

In looking for a source of vitamin E, various foods were tested, and wheat germ oil was found to be richest as a source, but from about 10 Kg. of dried wheat germs one gets about 1 Kg. of oil, and from this amount a maximum of 1 Gm. of pure vitamin E can be obtained. The isolation is very laborious; in the final stages it is accomplished by treating the concentrates with isocyanic acid, HNCO, thereby the hydroxyl group of the vitamin reacts to form an allophanate; $2HNCO + ROH = H_2NCONHCOOR$. The allophanate is purified by crystallization, and then the hydroxyl compound is regenerated by alkaline hydrolysis.

One of the first points to be discovered in the chemistry of vitamin E was its ready susceptibility to oxidation and its association with antioxidants in nature. Substances high in antioxidant power were found to be also high in vitamin E content. Acetylation or benzoylation of vitamin E concentrates did not destroy the vitamin activity but did destroy the antioxidant action. These facts, together with the formation of an allophanate, indicated clearly that there was one hydroxyl group in the vitamin molecule. Further investigation showed also that not one, but three distinct substances possessed vitamin E activity. These individual substances were called tocopherols and were designated as alpha, beta and gamma. Careful purification of the allophanate of alpha-tocopherol, followed by regeneration of the vitamin, led to a yellow oil having the composition $C_{29}H_{50}O_2$. Since this composition resembles very much that of some sterols, one of the first methods of attack on the structure of the vitamin was to dehydrogenate it with selenium. The result of this was a crystalline sublimate, tetramethylquinone. When the vitamin was heated alone, it decomposed and again a crystalline sublimate resulted, this time tetramethyl hydroquinone.

On the basis of these results, it was first thought that alpha-tocopherol was a mono ether of hydroduroquinone, but model experiments with mono ethers of known structure soon disproved this. By oxidation of alpha-tocopherol with chromic acid, Fernholz, in a brilliant piece of work, was able to isolate all of the oxidation products and from the structure of these, he deduced the correct structure for alpha-tocopherol. The substance is a chroman, specifically 2.5.7.8–tetramethyl–2–hexadecyl–6–hydroxychroman, in which the hexadecyl group is made up of three "isoprene" units joined head to tail. It thus really is a mono ether of a hydroquinone, but of a peculiar type. Since the benzene ring carries three methyl groups, this part of the molecule accounts for nine carbon atoms; the remaining 20 carbon atoms of the molecule were arranged as isoprene units joined head to tail. Now there occurs in nature an alcohol made up this way; it is phytol, the alcohol of chlorophyll. It was natural, therefore, to try condensing trimethyl-hydroquinone with phytol in the hope of effecting a synthesis of alpha-tocopherol. The synthesis was successful; in fact, it was astonishingly easy and alpha-tocopherol was made not only from phytol, but from phytylbromide and chloride, as well as phytadiene, by condensing any of these substances with trimethyl hydroquinone. At first there were some differences of opinion as to whether the heterocyclic ring in tocopherol was a ring of 5– or 6– atoms, but model experiments, both on the synthetic and degradative side, soon showed that the 6-membered ring was present, and that the original structure written by Fernholz was correct. Beta- and gamma-tocopherols have similar structures; they differ from alpha-tocopherol only in that one less methyl group is held by the benzene ring in beta- and gamma-tocopherols.

During the model experiments on the synthesis and proof of structure of alpha-tocopherol, a great many rather simple analogs were made. Surprisingly, many of these—some 40 out of over 130 tested—showed some vitamin E activity. Thus, the case of vitamin E is unique among the vitamins in that the activity is not specifically confined to any one compound, or class of compounds. The recent work in the field of vitamin K has shown that the specificity of this vitamin, too, is not limited to the vitamin itself.

The work on vitamin E has now entered the fifth stage. On the chemical side, experimentation is at present directed toward new and better syntheses for the tocopherols, and an extensive investigation of simpler compounds is underway. It is hoped that these investigations will lead to positive results with cheaper and more readily accessible compounds, and that the limits of vitamin E activity can sooner or later be correlated with chemical structure in some way so as to give a clue as to how the vitamin exerts its biological effect. On the clinical side, synthetic alpha-tocopherol is now available in some quantity, and with it, carefully controlled experiments can be made using a potent preparation of known purity. Vitamin E appears to be a promising substance to be used in the treatment of habitual abortion in women, and for similar use in the veterinary field.

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Investigations of Metabolism of the Fatty Acids

GEORGE O. BURR
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University of Minnesota

For almost one hundred years it has been recognized that animals can produce fats from other foods, especially carbohydrates. Although some authorities have believed that this power of synthesis is adequate for all needs, others have been equally positive that there are limitations, making necessary the inclusion of fats in the diet if health is to be maintained. Only during the last decade have definite experimental proofs been given that (1) there is a minimum fat intake without which certain animals cannot live and (2) much larger amounts of fat are required for the best health and optimum metabolism. These effects are due to fat per se and are in addition to the well known benefits of the fat-soluble vitamins which are concentrated in fatty foods. The vitamins will not be included in this discussion.

DIGESTIBILITY OF FATS

The first limiting qualities of any food are palatability and digestibility. Fresh, non-rancid fats are readily eaten and highly digestible, except when they are too hard. All edible fats which melt below 45° C (8° above body temperature) are easily digested, some measurements reaching 99 per cent in both rats and human beings. Stearic acid alone is very poorly absorbed, but when taken with liquid fatty acids of a mixed glyceride it is largely utilized.

Fatty acids may be fed as glycerides (natural fats), ethyl methyl or glycol esters, soaps, or the free acids. Free acids are likely to irritate the mouth and are therefore less palatable. Glycerides seem to have the highest food value of all the forms.

THE SHORT CHAIN ACIDS (LOW MOLECULAR WEIGHT)

Over 90 per cent of food fats are made of acids with 16 and 18 carbons. Butter and coconut oil are rich in acids with 4 to 14 carbons. Their high food value proves the ready utilization of these acids when used in a mixed fat and in moderate amounts. Only when the pure acids are used in excessive amounts do toxic effects become evident. Butyric and lauric acids have been especially mentioned by workers dealing with toxic levels.

Animal fats are almost devoid of fatty acids with less than 14 carbons (myristic). This is due to the fact that animals do not synthesize the shorter acids, nor do they readily deposit such acids from food fats. Acids with 4, 6, and 8 carbon cannot be deposited at all. Only by starvation and forced feeding can much of the 10 and 12 carbon acids be put into body fat. The shorter acids burn readily and seem to be used to some extent in the synthesis of longer chains.

All natural fats are made of acids with even carbon numbers, 4 to 24. Synthetic acids with odd numbers are as readily burned as the natural ones and support growth of animals as well. The chief difference that has been noted is that the odd carbon acids are not ketogenic. The natural acids burn in units of two and four carbons, some of them appearing as ketone bodies in the urine under certain conditions. The three carbon residue of the odd carbon acids can be quantitatively connected to glucose or glycogen and appear to have strong anti-ketogenic action.

EFFECTS OF UNSATURATION

Higher animals synthesize a fairly hard and saturated fat from carbohydrate. But when large amounts of unsaturated liquid oils are fed, these are deposited in the tissues in sufficient quantity to render the body fat soft and oily. In pigs this produces so-called "soft pork." From studies with rats and calves it seems that too much of such an oil can be fed for the good of the animal.

Especially notorious is cod liver oil, which is rich in very highly unsaturated acids. Small daily doses will greatly cut milk production in cows and goats. Four per cent in the diet will kill guinea pigs by producing muscle lesions.

ESSENTIAL FATTY ACIDS

Rats are so limited in their synthesis of linoleic acid that they will not survive if it is excluded from the diet. It is now called essential and its absence leads to (1) scaly skin; (2) marked retardation of growth; (3) kidney lesion and hematuria; and (4) early death. No other plant acid completely replaces linoleic. Linolinic acid will cause renewed growth but does not clear the skin. A similar action is shown by the highly unsaturated acids of cod liver oil. The only known animal acid comparable to linoleic in its effects is arachidonic.

Practical results are now coming from research as the nutritive value of fats. Some eczemas of both infants and adults have responded to doses of oils like linseed, corn and lard, when no other treatment was satisfactory. Also the skin lesion, acrodynia, attributed to vitamin B_6 deficiency is alleviated by doses of oils or linoleic acid. A high per cent of fat in the diet will prevent beri-beri, and gives the highest muscular efficiency. Milk production in cows declines when the diet contains less than 4 per cent fat.

In view of the above facts it is clear that fat cannot be excluded from the diet and fairly high levels are indicated for optimum living.

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Production, Utilization and Significance of Blood Proteins

(Annual Lecture of the Minnesota Pathological Society)

GEORGE H. WHIPPLE
Professor of Pathology and Dean of the Medical School,
University of Rochester

Dr. Whipple spoke on the origin and importance of the proteins of the blood, particularly the proteins of the blood plasma. In brief outline the evidence was presented, largely from Dr. Whipple's own experiments, to show that the liver unquestionably plays an important role in the production of the plasma proteins. The evidence for this role in the production of the albumin fraction seems to be unequivocal, and

probably the majority of the globulins of the blood plasma also have their origin in the liver.

The primary method of study used by Dr. Whipple and his associates at the University of Rochester Medical School consists in plasmapheresis experiments on dogs coupled with careful studies of the nitrogen intake and excretion. The dogs are rendered hypoproteinemic by removing relatively large quantities of the blood, separating the cells and serum, and returning the blood corpuscles suspended in saline solution to the blood stream. By this means the animal loses at a single such experiment up to one-sixth of its total plasma proteins. This procedure is repeated as often as is necessary to maintain the plasma protein concentration at any given low level. The animals suffer no injury in such experiments other than the reduction in the plasma proteins and they continue in apparent vigorous health.

Such hypoproteinemic dogs have been studied for years by Dr. Whipple and associates, during which time the rate of regeneration of the plasma proteins could be followed from day to day. It is a striking feature of these studies that they show clearly the great reserve of plasma protein-forming power in the animal, the rate of regeneration being several times as great as that of hemoglobin. However, with many of these animals Whipple and his associates were able to maintain very constant low protein concentrations in the blood plasma. Down to 4 per cent protein concentration there is no apparent effect on the animal whatsoever. At around 3.5 per cent protein concentration in the plasma, there is a tendency to edema which can be demonstrated if the animal is given large quantities of saline, or otherwise treated in a fashion calculated to initiate the onset of edema. At about 3.3 per cent concentration, the animals become definitely edematous.

Studies of the albumin-globulin ratio in these animals showed that apparently globulin is more readily regenerated than albumin, and the A/G ratio in dogs subjected to long continued repeated plasmapheresis is apt to be closer to 1 than to the normal ratio of about 2.

A very important part of the study at the University of Rochester by Whipple and his associates is the careful evaluation of the readiness with which different types of food can supply nitrogen for the regeneration of the plasma proteins. The best food of all for this purpose was blood serum itself, but liver, heart and kidney were also very effective. In these studies a great variety of food stuffs were tested and the amount of organic nitrogen in the food which was used to make new protein in the blood was measured. Plant proteins can also be used to synthesize plasma proteins in the body, by the dog, but in general they are less effective than proteins of animal tissues.

As might be expected, the efficiency with which fed proteins are converted into plasma proteins in the animal body varies with the amounts supplied. If a great excess of protein is fed, the efficiency is low, but when the protein intake is restricted, the efficiency may be as high as 35 per cent with feeding of serum proteins themselves. In other words, 35 per cent of all the nitrogen in the fed serum reappears in the blood plasma as plasma protein. The efficiency of utilization of kidney, liver and heart is from 15 to 24 per cent when these are fed in limited amounts. Other protein foods exhibit efficiencies from 5 per cent to values approaching those for kidney.

After ascertaining the types of food most effective, Whipple and his associates are now studying the utilization of the various pure amino acids in the regeneration of plasma proteins. Marked differences between the amino acids in this respect have already been noted, and more particularly certain combinations seem to be more effective than others. Among the amino acids which are being studied intensively at this time in this work are alanine, glutamic acid, cystine, and methionine.

This work has re-emphasized the importance of the plasma proteins in the maintenance of a normal fluid balance between the blood and the tissues, and has shown how sharp is the critical point between normality and the edematous state. The nutritional aspects of the work are, however, of greater consequence, particularly as they should provide very much more precise knowledge about the necessary amounts and substances required for the maintenance of nitrogen equilibrium. In the course of the work, there is accumulating a growing body of data which can be viewed as fundamental to our understanding as to the mechanism whereby the plasma proteins are formed in the body.

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Investigations Concerning the Problem of Thrombosis

CHARLES H. BEST
Professor of Physiology, University of Toronto

After a brief historical resumé, Dr. Best described the so-called white thrombus which is composed mainly of platelets. In tracing the history of heparin, it was pointed out that the first useful preparation of an anticoagulant from normal tissues was obtained by McLean in Howell's laboratory. Professor Howell pioneered in the field of purification of heparin and in the study of its mode of action. In collaboration with several of his associates, Dr. Best undertook in 1929 to explore further the physiological role of heparin and its clinical application. Purified preparations were obtained and Jorpes showed that the anticoagulant was a sulfuric ester of a carbohydrate. The precise chemical constitution is still uncertain but according to Dr. Best the substance may be considered to be a carbohydrate complex containing probably a uronic acid and glucosamine, the latter partially or totally acetylated with respect to the N-containing group. The hydroxyl groups of the complex are in part or totally esterified with sulfuric acid in such a way that the N:S ratio is 2:5.

The site of formation of heparin in the body is still uncertain but much evidence indicates that the mast cells of Ehrlich found mainly in connective tissue near capillaries and in the walls of the larger blood vessels may be the source.

There is considerable evidence that the incoagulability of the blood in anaphylactic shock is due to the liberation of heparin.

The administration of suitable doses of heparin greatly prolongs the clotting time of blood. Continuous intravenous administration of material diluted in saline provides the best procedure for experimental work. The formation of thrombi on the intimal surface of veins which had been injured by mechanical or chemical means can be completely prevented by adequate administration of purified heparin. The traumatized vein can be made to heal completely without formation of a thrombus. In analyzing this effect a most important result was obtained, namely that heparin prevents the agglutination of platelets either in the blood vessels or in glass cells. This observation gives more than a clue as to the mechanism by which heparin prevents the formation of mural thrombi.

In discussing the clinical applications, attention was called to the importance of having a highly purified non-toxic material. There is little doubt that heparin is a valuable adjuvant in vascular surgery, and it has been used in connection with transfusions as well as in those situations in which it can be employed as a prophylactic against thrombosis and subsequent embolism.

C. Some Aspects of Immunity and Chemotherapy

Presiding: WINFORD P. LARSON
Professor of Bacteriology, University of Minnesota

Recent Chemical Trends in Study of Immunity

MICHAEL HEIDELBERGER
Associate Professor of Bio-Chemistry
Columbia University

Dr. Heidelberger traced the history of our knowledge concerning antigens and antibodies as chemical entities. Most antigens are proteins. The researches of Landsteiner showed that the introduction of various chemical groups into the nuclei of proteins caused the appearance of serological specificities differing from those the protein possessed originally. The term "hapten" was introduced to characterize the chemical group so added to proteins which overshadowed the original specificity of the protein and would cause cross reactions between otherwise unrelated proteins. Almost any chemical alteration at any portion of the molecule may produce a rather characteristic change in specificity.

The protein antigens directly involved in infectious diseases are in general not well studied. Certain bacterial toxins, for example that of diphtheria, have been intensively studied. The latter appears to be a protein of 72,000 molecular weight. Certain of its properties have been established but much remains to be done.

In the large group of encapsulated micro-organisms to which the pneumococcus belongs, the most important antigen occurs in the capsular layer. Each serological type of pneumococcus seems to be characterized by a polysaccharide to which the type-specific serological reactions are due.

In connection with the chemical nature of antibodies Dr. Heidelberger stated that it is now generally conceded that antibodies are not merely hypothetical substances of unknown nature associated with globulin but are actually modified serum globulins. These modified globulins (antibody) constitute as much as 50 to 75 per cent of total serum globulin in immune serum.

A theory of Breinl and Haurowitz seems to be substantiated by these findings. According to this theory, an antigen adsorbs at a cell surface (site of antibody production) and impresses upon the new globulin molecule being formed a special configuration which is a mirror image of the antigen molecule. This explains quite satisfactorily the success of later combination, by adsorption, of antigen with specific antibody. Dr. Florence R. Sabin used a colored protein antigen to trace the origin of antibody to the phagocytic cells of liver, spleen, tissues, and lymph nodes, which normally produce serum globulin.

Dr. Heidelberger, in his own work, is striving to establish immune phenomena on a rational, quantitative chemical basis. In an effort to develop microanalytical techniques for analysis of antigen and antibody, he has ingeniously chosen to use a N_2-free antigen, type III pneumococcal polysaccharide. This makes it possible to analyze an antigen antibody precipitate for antibody by direct nitrogen determination, and for antigen by difference. On the basis of a number of assumptions he has devised a theory to explain quantitative relationships between antibody and antigen. In applying this theory to both precipitin and agglutinin reactions, the important observation was made that type specific pneumococcal anticarbohydrate was found to be the same whether measured as agglutinin or as precipitin.

These new methods of analytical control and improved methods of immunization have made available a rabbit antiserum against H. influenzae, Type B, of 5 to 10 times the potency of older immune sera.

Ultracentrifuge studies have revealed a biochemical basis for the superiority of rabbit antipneumococcal serum over serum of such animals as the horse, cow and pig.

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The Biology of Animal Virus Diseases

ROBERT G. GREEN
Professor of Bacteriology, University of Minnesota

Dr. Green developed the thesis that by a series of adaptations microbes are gradually transformed to incomplete forms of life which because of their minute size are called viruses. He pointed out that there is no fundamental difference between diseases caused by microbes and those caused by ultra-microbes. The ultra-microbes range in size from structures barely visible under the microscope to disease incitants which are particles about 1/25 that size. The viruses are differentiated from bacteria first by their smaller magnitude and second by their inability to grow on artificial media. This obligatory parasitism is an important aspect of their nature. Dr. Green infers that viruses are related to free living forms from which they have developed by adaptation associated with parasitism. He refers to these processes as a sort of retrograde evolution.

Dr. Green discussed at some length the detailed study of fox encephalitis and canine distemper which he has carried on for a number of years. He pointed out that particular viruses have predilections for certain cells and organs in the body of the host and that the sites of preference depend upon the history of the virus itself. In the spontaneous disease, the site is somewhat different from that produced experimentally by animal passage. Dr. Green concludes that viruses may be definitely modified by the different environments which they find in unrelated species of animals. This power of adaptation is of great importance to the survival of the virus itself but is of equal importance in providing a means whereby an immunity may be established to an altered virus which will protect against the more virulent original form.

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Observations upon the Mode of Action of Sulfanilamide and Its Derivatives

PERRIN H. LONG
Associate Professor of Medicine
Johns Hopkins University

Dr. Long discussed the mode of action of sulfanilamide and its derivatives. In his introduction he stated, "It has seemed strange to some that although more than six years have elapsed since Foerster first reported upon the clinical use of Prontosil in the treatment of a staphylococcal infection, there is still doubt in the minds of many observers concerning the mode of action of sulfanilamide and its derivatives. However, it is to be remembered, that despite more than twenty-five years of intensive investigation, pertinent facts regarding the action of arsphenamine upon the spirochaete are just coming to light, and that knowledge of *how* and by what mechanisms chemotherapeutic agents in general are effective, is very scant. In view of our lack of information on the fundamental processes which are involved when an effective chemical agent injures or kills a susceptible micro-organism, it is scarcely surprising that one cannot explain in definite terms the way in which sulfanilamide and its derivatives behave in the control of infectious diseases."

"In Gerhard Domagk's original report upon the chemotherapeutic effects of Prontosil in experimental hemolytic streptococcal infections in mice, the fact that the drug was effective "*nur im lebenden Organismus*" was stressed, as was also its lack of *bacteriostatic* or *bactericidal* effect *in vitro*. This observation has been repeatedly confirmed in respect to Prontosil and its companion azo-dye, Neoprontosil."

Further he said, "In discussing the mode of action of sulfanilamide and sulfapyridine, it should be borne in mind that while their activity appears to be directed solely against the invading micro-organism, the recovery of the infected subject seems to entail two factors—the drug factor and the host factor. That is to say that while the drug can bring the infection under control, it requires the coöperation of the host's defense mechanism to dispose of the infectious agent. This statement is in agreement with the conception of those investigators who have attacked the problem by studying the *in vitro* and *in vivo* effects of these drugs.

"Under the heading of the drug factor comes the activity of these compounds in inhibiting the growth of, or possibly actually killing, susceptible bacteria and their ability to neutralize the harmful effects of the toxic products of certain micro-organisms. The host factor represents the response of the body's defense mechanisms, such as antibody production and mobilization of phagocytic cells to the infection produced by micro-organisms which have been altered as a direct result of the drug factor.

"Quite recently, Shaffer has advanced the hypothesis that sulfanilamide is oxidized in the presence of hydrogen peroxide, plus essential catalysts, to an active compound. This product is so strong an oxidant that it destroys catalase, thereby permitting more hydrogen peroxide to accumulate. As a result, more and more of the oxidation product of sulfanilamide is formed until eventually a concentration is reached which is sufficient to attack all reactive reducing systems of the cell, and bacteriostasis or actual killing of the micro-organisms ensues."

He discussed another chemical hypothesis concerning the mode of action of sulfanilamide proposed by Mellon and his collaborators. "These observers noted that dilute solutions of sulfanilamide which had been irradiated with ultraviolet light, possessed the property of inactivating catalase. It has been long known that if catalase is inactivated in aerobic cultures of pneumococci, peroxide accumulates rapidly and may reach a concentration that is bactericidal for the pneumococcal cells. Hence, it was reasoned that if sulfanilamide was able to inactivate catalase, peroxide would accumulate and this factor might account for the bacteriostatic or bactericidal action of sulfanilamide."

They described the mechanism as follows: "The growing bacterial cell has the power to convert sulfanilamide, presumably through mild oxidation, into a derivative which is a highly active anticatalase. This reaction produces an accumulation of anticatalase in the immediate vicinity of the cell. The streptococcus and pneumococcus, being active producers of hydrogen peroxide, are able to grow only so long as the peroxide concentration can be kept below a critical level by outward diffusion or destruction . . . in the presence of anticatalase, inactivation of catalase takes place in the zone immediately adjacent to the cell with resultant accumulation of hydrogen peroxide to toxic levels."

Dr. Long presented a third theory concerning the mode of action of sulfanilamide which he says is based upon the idea "that the drug acts on bacteria to prevent them from utilizing the substrate or upon the substrate to prevent it being utilized by the bacteria. Levaditi who was one of the first to champion this belief, considered that sulfanilamide was changed to a sulfur-protein complex in the body cells. This compound he called the "active principle X" and he thought that it blocked "the assimilative potential of the nutritive materials which the body places at the disposal of the metabolism of the (virulent) streptococci."

"Some time later Lockwood independently arrived at a somewhat similar concept of the mode of action of sulfanilamide. His observation, that the addition of small amounts of peptone to human serum cultures definitely decreased the bactericidal, and in some instances, the bacteriostatic effects of the drug upon virulent hemolytic streptococci, led him to suggest 'that sulfanilamide prevents the specialized metabolic activity required of invasive organisms' and 'that this effect may be achieved through prevention of the utilization of the protein substrate by the organisms.' "

He concludes, "It seems quite probable from the evidence now available, that the chemotherapeutic activity of Prontosil and Neoprontosil in streptococcal infections is the result of their break down to sulfanilamide in the tissues of the infected host. Sulfanilamide and sulfapyridine act as bacteriostatic and, under certain conditions, as bactericidal agents against susceptible bacteria. They also seem to have the power of inactivating certain bacterial toxins.

"The mechanism by which these drugs produce bacteriostasis and inactivation of toxins remains unknown despite several attempts to explain it. The importance of the response of the host, to an infection which is treated by chemotherapy, should be recognized if a complete picture of the mode of action of these drugs is to be acquired."

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Chemistry in Urinary Antisepsis

HENRY F. HELMHOLZ
Professor of Pediatrics
The Mayo Foundation, University of Minnesota

Dr. Helmholz traced the history of the chemical approach to this problem, beginning in 1878 when the alkalinization of the urine was recommended for the treatment of infections with an acid urine and acidification in cases of ammoniacal cystitis. Although acidification is now known to be definitely advantageous, it is doubtful whether acid therapy in the early days brought about the necessary degree of acidification necessary to produce bactericidal effects. Methenamine was first shown to have antiseptic effects in acid urine in 1884. This substance remains unchanged in an alkaline medium but is split into ammonia and formaldehyde in acid. Dr. Helmholz showed some years ago that methenamine in a given concentration was much less effective as a bactericidal agent in urine at a pH of 6.0 than at pH 5.5. There was found to be a definite correlation between the pH and the concentration of methenamine necessary for complete bacteriostasis.

The history of the use of numerous other drugs was described, the majority of which have been discarded in favor of acidification therapy and the sulfonic acid derivatives. The importance of beta-oxybutyric acid grew out of observations that acid urines produced by ketogenic diets were more bactericidal than would be expected from the pH. It was found that the keto acid, itself, possessed bactericidal properties which were in proportion to the amount of the free acid. It was a great advance when Rosenheim suggested the use of mandelic acid in place of the butyric since the latter is very much more difficult of administration than the former.

The most recent chapter in urinary antisepsis is that involving sulfanilamide and its relatives. This chemotherapeutic agent is valuable because its action is not dependent upon an acid urine and can be used when there is severe impairment of kid-

ney function. It is however effective with a limited number of types of organisms. There is still no single universally useful urinary antiseptic and Dr. Helmholz pointed out that many new sulfonic acid compounds should be tested for their bactericidal effect on bacteria found in urinary infections. In concluding he said, "Our greatest problem today lies in the treatment of the patient having damaged kidneys and in those with an alkaline urine produced by bacteria splitting urea."

D. SOME APPROACHES TO THE NERVOUS CONTROL OF THE ORGANISM

Presiding: ANDREW T. RASMUSSEN

Professor of Neuro-Anatomy, University of Minnesota

The Physiochemical Approach to the Problem of Convulsive Mechanisms

IRVINE MCQUARRIE

Professor of Pediatrics, University of Minnesota

The purpose of this paper was to review certain experimental data obtained from investigations on the mechanism of generalized convulsions. It was pointed out that further progress toward a solution of the enigma of epilepsy appears at the present time to depend upon an elucidation of the convulsive mechanism *per se* because all efforts to discover an organic or metabolic basis for this disorder have failed.

On the tentative assumption that the central physiochemical events of a generalized convulsion, like the outward neuromuscular manifestations, are similar, no matter what the inciting cause, studies relating to the convulsive mechanisms were made in the better understood convulsive disorders, hypoparathyroidism and hyperinsulinism, as well as in epilepsy itself. The grand mal seizure of genuine epilepsy and generalized convulsions induced experimentally or occurring in other disorders have recently been shown by Berger, Gibbs and Lennox, and others to be the outward manifestations of increased electrical activity in the cerebral cortex as indicated by electroencephalographic "brain wave" tracings. What remains to be determined in the case of epilepsy is: (1) the nature of the chemical and physical reactions giving rise to such abnormal electrical potentials and (2) the character of the innate or constitutional defect in the brain cells of the epileptic which is responsible for the peculiar periodic breakdown in the physiological mechanism governing the normal rhythm of electrical potentials.

It has been recognized for some time that a heterogenous series of factors, such as alkalosis, excessive cerebral excitation of various types, cortical injury and "superhydration" of brain tissue (under certain conditions) tend to provoke typical seizures in epilepsy; while other body states, such as sedation, narcosis, acidosis and "dehydration", tend to prevent their occurrence. The facts, (1) that the latter functional states happen to be those associated with a decrease in cell membrane permeability to certain ions and (2) that the former happen to be those having an opposite effect, have suggested that the characteristic convulsive tendency in epilepsy may be related to a disturbance in this basic function of the brain cells. More direct evidence for this tentative interpretation has recently been obtained by Spiegel, who determined the permeability of brain tissue in vivo under a wide variety of experimental conditions by means of the electrical conductivity method.

Experiments on epileptic patients have shown that convulsions can be induced in these subjects practically at will by sustained postpituitary (pitressin) antidiuresis when they are maintained on a low-mineral, high-water intake. The dilution of the extracellular body fluids thus produced is apparently responsible for the convulsion as indicated by the fact that convulsions do not occur if sufficient sodium chloride to prevent such dilution is given during the test. The fact, that normal persons do not have convulsions when a similar degree of dilution of their body fluids is produced, suggests that the protective barrier (brain cell membranes?) against the harmful effects of this change in osmotic pressure is inherently defective.

Experiments on a 15 year old boy suffering from parathyroid tetany showed that generalized convulsions could be induced by such procedures as the above described water-retention test, intravenous administration of fibrile doses of killed typhoid vaccine and voluntary hyperventilation of the lungs after he had been maintained for several weeks on a low mineral diet but not after a diet high in minerals had been used for a similar period. Values for the serum calcium, inorganic phosphorus and proteins were not significantly different for the two periods. During the period of low-mineral intake, prevention of dilution of the extracellular fluids by administration of sodium chloride during the pitressin test greatly lessened the convulsive reaction. Artificially induced fever (diathermy) failed to induce convulsions even during the low-mineral period, presumably because of an excessive water loss in the sweat. Parathyroid extract caused a rise in the serum calcium and a fall in the phosphorus and prevented the induction of convulsions, in spite of the artificially imposed dilution of body fluids, even during the low-mineral dietary period. The impression obtained from these experiments was that the primary disturbance in calcium and phosphorus metabolism in parathyroid tetany produces a temporary, reversible change in the brain cells which makes them respond to certain changes in body state in a manner resembling that characterizing the epileptic subject.

Extensive studies on insulin convulsions in animals with a view to determining the relative significance of changes in the levels of serum potassium and inorganic phosphorus as well as blood sugar in relationship to the occurrence of convulsions, indicated that hypoglycemia alone shows a constant relationship to the convulsive reactivity. It was likewise shown for both normal and adrenalectomized dogs that breathing atmospheres extremely low in oxygen (5 per cent to 12 per cent) or high in carbon dioxide (15 per cent) either prevents insulin convulsions entirely or greatly delays their onset, even when the degree of hypoglycemia reached is much greater than that required for induction of a convulsion in room air.

These results were interpreted as indicating that anoxia is not the cause of insulin convulsions, as recently claimed by several workers. They further suggest that the role of hypoglycemia may be merely that of effecting a specific change in the brain tissue which permits a certain orientation of ions on cell surfaces with the resulting development of abnormal electrical potentials.

Methods of Analysis of Nervous Action

Herbert S. Gasser
Director, Rockefeller Institute for Medical Research

Dr. Gasser commented on the historical background of research in the field of neurophysiology.

"The history of neurophysiology is characterized by much astute reasoning, stimulated by the obscurity with which the nature of the nerve impulse has been surrounded and prompted by the desire to penetrate through the obscurity to something intellectually tangible. Illuminating ideas have appeared far in advance of the time at which they could be proved or disproved. Many of these ideas have been embodied in the form of models. For these models physiologists are often criticized—justly and unjustly. Justly, because models can belie their proper function as tools in empirical research and defeat the methods of science by becoming vehicles for the projection of a creation of the observer's mind upon reality. Unjustly, because models in their place are valuable. When a biological phenomenon can be imitated in a physical or chemical system, our faith is strengthened that a physiochemical interpretation of the phenomenon can be found. Observations are made and fragments of information are gained. Integrated into the model, these fragments acquire a wider meaning and the model, enriched, acquires a greater usefulness."

"Nerve models have now been developed to a degree of complexity which prevents their construction outside of the imagination. It is necessary to combine the core conductor principle of Hermann with a concentration cell of Nernst, or a sieve membrane of Ostwald, and then in some way to assimilate the combination with the iron-wire model of Lillie, in order to arrive at even a skeleton representation of the membrane hypothesis. The modern era of nerve physiology started with the membrane hypothesis. And so well has the hypothesis served that at no time during its history has it found a competitor. Today it stands more firmly entrenched than ever before.

"As you know, according to the tenets of the hypothesis, a nerve fiber is considered to be a fluid conductor, surrounded by a labile surface film maintained in a steady state through the expenditure of energy derived from oxidation in the fiber. Across the film a potential gradient is maintained by an ionic concentration difference at its borders, and possibly by other factors. During activity a molecular change is supposed to occur in the surface, with a resultant fall of the potential gradient, a flow of current from the adjacent segments and excitation of these segments by the current,—the whole process being repeated throughout the length of the fiber and constituting the nerve impulse. Such in brief is the theoretical background for the physical and chemical measurements that make up the analysis proper."

Dr. Gasser pointed out that nervous action can be studied by observing the effect of the nerve on the organ that it innervates or by studying the changes that occur in the nerve itself when it is active. These changes, while they are probably fundamentally chemical, have physical concomitants which are easier to observe. One can measure the heat production associated with the passage of a nerve impulse, but the most useful sign of activity in a nerve is the electrical potential change. This change takes place with great speed and by the use of accurate electrical recording instruments, time factors as well as intensity factors can be studied.

In discussing the form of the action potential, Dr. Gasser said, "A word of explanation must be introduced at this point in order to make clear why the form of the action potential is of interest. The details of the form are known through the parts of the nervous system that are readily accessible to observation—the nerve fibers. Three kinds of nerve fibers exist, which differ somewhat in their properties; but in all three the configuration of the action potential is in accord with a basic pattern. The action starts out with a large, short negative deviation, known as the spike, and is continued with a relatively prolonged set of changes of low voltage known as the after-potentials. In their simplest form the after-potentials start out with a negative component (in one fiber class this component is vestigial) and are continued by a longer positive component. During the period of the negative component the fibers are more excitable than when they are at rest, and during the period of the positive component they are less excitable.

"Numerous bits of evidence support the view that in the central nervous system the action potential of the neurons follows the basic pattern to the extent at least of being made up of a spike followed by a positive after-potential. As a corollary to this view it would follow that during the period of the positive after-potential in a postganglionic fiber it would be more difficult for impulses to pass the synapse. In favored positions, where the relationship can be tested, this correlation has been found to hold."

In conclusion Dr. Gasser remarked, "It is scarcely any longer prophetic to look forward to a biology in molecular dimensions, for there is no small amount of contemporary interest in intramolecular and intermolecular patterns,—witness the recent history of the myosin fibril. And there is a growing body of knowledge relating to the subject, based upon direct and indirect information derived from physical and chemical methods.

"In nerve physiology the goal toward which we are turned is a complete understanding of nerve mechanics. It is not too soon to demand knowledge of the position of the molecules in the fibers; nor is it too audacious to inquire into how molecules move during activity. Of all the highly differentiated and highly active structures of the body, a nerve fiber is one of the simplest. Hence, if any biological structure is to be proven not too complex as a physical system to be subjected to successful analysis, it should be this one. At any rate, until answers have been obtained to the questions that have been posed, full meaning content cannot be put into the term 'irritability'."

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The Nervous System in the Regulation of Visceral Processes

Detlev W. Bronk
Professor and Director, Institute of Neurology
University of Pennsylvania

Dr. Bronk described the general attack on the fundamental processes of nervous conduction which is being carried on by means of the ultra-modern physical tools developed by Gasser and Erlanger at St. Louis, Adrian and Matthews at Cambridge University, and at Dr. Bronk's own laboratory in Philadelphia. The recording of the form, voltage, and frequency of the impulses in nerve fibers has now reached almost incredible degrees of delicacy. Much of this work involves the accurate registration of the nerve impulses passing along single nerve fibers—in many cases at rates exceeding 30 impulses per second.

Nerve trunks are cut until only a very few, or perhaps only a single nerve fiber, remain to carry the messages between the periphery and the center. When electrodes are placed on such nerve fibers, there appears a regular succession of discrete impulses instead of the confused surge of electric potentials which is obtained from the ordinary "nerve" which contains many individual fibers. If only a single fiber remains intact, the impulses, from a quiet end organ maintained under constant conditions, come over the attached nerve fiber with great regularity. Each potential wave has the same voltage and these waves appear at absolutely regular intervals unless the end organ stimulus is altered. When such alteration occurs, if there is an increase in the stimulus to the end organ, the nerve messages

are no greater in voltage, but the frequency of the potential waves along the nerve becomes greater. Frequently it may happen that a preparation is made containing two nerve fibers having different thresholds or connected to end organs of different thresholds. It may be that in the resting state impulses of only a single nerve fiber are visible in the oscillographic record. If the stimulus is increased, the impulses along this first nerve fiber do not increase in voltage, but they increase in frequency and finally the second nerve fiber comes into play, sending its own independent messages along at regular intervals so that these may also be recognized in the same oscillographic record.

By such studies with the oscillograph and electrodes placed on partially severed nerves, Bronk and his associates have intensively studied the activities of the carotid sinus. It was already known that the carotid sinus responds to increased arterial pressure by sending impulses which slow the heart and also that the carotid sinus is sensitive to carbon dioxide, so that an increased amount of carbon dioxide in the blood produces increased circulation and respiration by way of stimuli from the carotid nerves to the heart and respiratory centers.

Bronk's work showed clearly that there are at least two kinds of nerve endings in the carotid sinus, and that these act quite independently of each other. The nerve endings in the wall of the sinus are pressure sensitive and play an important role in the regulation of the blood pressure of the body as a whole. The nerve endings in the carotid body are specifically chemically sensitive and their response to alterations in the oxygen and carbon dioxide in the blood is important in maintaining an adequate and proper amount of respiration.

Such studies as those on the carotid sinus are being applied to other parts of the body, in particular it is being attempted to make studies of the pathways within the spinal cord and the gray matter of the brain. The development of these methods provides powerful tools for the attack and the importance of some of the results, such as those on the carotid sinus, has already become apparent.

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The Argument for Chemical Mediation of Nerve Impulses

(The Annual Alpha Omega Alpha Lecture)

WALTER B. CANNON
Professor of Physiology, Harvard University

Dr. Cannon pointed out that at the present time there is a heated argument between two schools of thought among neurophysiologists concerning the mechanism of transmission of excitation across synapses and at nerve end plates. There appears to be a protoplasmic discontinuity in these situations. One school favors the view that the action current itself stimulates across the interruption; the other holds that the transmission is mediated by a chemical substance set free at a nerve ending. This substance is thought to be adrenalin at sympathetic synapses and acetylcholine at parasympathetic synapses, at synapses in motor end plates and in sympathetic ganglia. Dr. Cannon limited his discussion to synapses in which there is evidence that acetylcholine is liberated. Dr. Cannon pointed out that drugs which block the effect of nerve stimulation do not prevent the liberation of acetylcholine. Therefore he concluded that the nerve impulses are delivered to the tips of the active nerve fibers and finds it difficult to understand why the action current could not stimulate across the synapse. The fact that these same drugs prevent the action of acetylcholine on the end organ when that substance is introduced into the circulation leads him to conclude that it is much more likely that the normal transmission across synapses is of a chemical nature than a physical one.

Dr. Cannon next pointed out that the argument concerning the short delay at synapses can be turned against the electrical theory. This delay is at least five times as long as that required for the quickest cells to respond to electrical currents. Dr. Cannon then brought experiments with the use of curare into his argument. He pointed out that stimulating the motor nerve to a curarized muscle at the rate of 60 shocks a second greatly prolonged the period of paralysis as compared with the symmetrical control muscle tested periodically for recovery from curare. This effect could not be due to fatigue in the muscle for the muscle was not contracting. Likewise it could not be fatigue in the nerve because records of their action potentials showed that the nerve impulses might be full sized when they were having no effect. These phenomena are difficult to explain on an electrical theory of transmission but have ready interpretation on the chemical one.

So with several other experimental phenomena the chemical theory of transmission accounts readily for phenomena which appear now to be unintelligible in terms of the electrical excitation hypothesis. As a final argument Dr. Cannon recalled the experiments of Rosenbluth and Luco who recorded the action potentials of the tongue muscles which had been deprived of motor nerves for about a week. Stimulation of the lingual nerve which supplies the blood vessel to the tongue induced the appearance of typical action currents in the completely denervated muscle fibers. Here, according to Dr. Cannon, is a stimulation of motor units clearly not due to electrical transmission, for the nerve stimulated was not distributed to the muscle which responded and furthermore the latent period was too long for that occurrence. In this instance it appeared that acetylcholine liberated at parasympathetic endings in the blood vessels stimulated the muscles which the blood vessels supply.

III. The Medical School of the University of Minnesota and the Community

In connection with the semi-centennial celebration, two meetings were especially planned for the general public and one evening session was arranged with the interest of the alumni of the medical school and its particular friends in mind. The first of the public meetings was a general University convocation addressed by Dr. Thomas Parran, Surgeon-General of the United States Public Health Service on the subject, "Medical Education, Research and the Public Health." This meeting was attended by more than 4000 persons and broadcast over the facilities of WLB, the University radio station. Dr. Parran paid tribute to the realism and vision of the physicians in this community who foresaw what a single great tax-supported school could do to serve this state. He devoted the main body of his address to a consideration of the importance of scientific research in medicine to improvement in the health of our people generally. He called attention to the fact that in these unhappy times, which have fallen upon the world at large, the burden imposed on us who have the good fortune to live in the one island of peaceful democracy has become greater. According to Dr. Parran, it should

be obvious that our support of research should be more generous. Never before have added investments in research been so urgently needed. If the wellsprings of private philanthropy cannot meet the needs, there must be increasingly greater use of public funds for this most important object. He said, "Wisely used, it will contribute more to the national defense and prosperity than the biggest of the battleships."

Dr. Parran stressed the importance of a clearer perspective between research and the practice of medicine. He said, "Doctors of Medicine lean upon the laboratory sciences as the stones of the arch upon the keystone." He forcefully emphasized the interdependence of sound medical practice and social conditions. He pointed out the importance of economic status to the occurrence of a considerable number of diseases and insisted that it is becoming more and more necessary for the physician to have a broad background in history, sociology and economics in order that he may view the contribution of his profession, and in particular his own contribution, in a more intelligent way. Dr. Parran spoke at some length concerning the rapidity of the changes in the technical aspects of medicine. He said, "When we rode in stage coaches, no new models were needed until the old vehicles wore out. When mechanical progress began, technological obsolescence set in." It is obvious, according to Dr. Parran, that although there has been much improvement in medical education and much progress in medicine, we still have a long way to go in applying what we already know and in solving the fundamentals of such pressing problems as cancer, poliomyelitis and the degenerative diseases of advancing years.

He said in closing, "It is not by accident that dictatorships arise out of chaos, and chaos from neglect of human misery. If we have the realism to face this fact, we can have the vision to save ourselves the aftermath. Research, medical education and the public health . . . it never mattered so much as now that they should be well and truly done."

At the second public meeting, Governor Harold E. Stassen addressed a large meeting in Northrup Auditorium on "Medicine and the Commonwealth." Governor Stassen referred to the direct interest of the community in the quality of the medical profession that serves it. He spoke of the intimate dependence of the quality of medical practice upon the standards of medical education. He stressed the importance of maintaining the element of individual personal initiative in the medical profession which he said must be maintained in any system for providing adequate medical care for the lower income groups. Governor Stassen emphasized again the importance of training physicians who will be leaders in their communities in order that their social vision and background of culture may play a more important role in the enlightened political life of the community.

Speaking on "The Place of Medicine in a University," President Guy Stanton Ford stressed the advantages which are to be gained mutually by the physical proximity of schools of medicine and other colleges in a university. He said it is not the difficulties of administration which make close physical contact desirable rather it is the opportunity for day-to-day contact between workers in the various fields which engender sympathetic understanding, and which allow opportunity for suggestion and the sharing of ideas. President Ford said, "Science and research, teaching at all levels and especially in college and professional training, are a seamless web whose pattern determines a nation's welfare and its civilization."

In closing, President Ford paid tribute to the work of the late Dean Elias P. Lyon to whom, he said, more than to any other one man, the University of Minnesota Medical School of today is indebted. In speaking of Dean Lyon's contribution to the building of the medical school, he said, "It was the outcome and is the enduring memorial of the patient, modest and selfless, utterly honest and far-seeing man who came to the deanship of the medical school in the mid-year of the half-century we commemorate."

Professor Anton J. Carlson, from the department of physiology at the University of Chicago, delivered the concluding address of the public meeting on October 12, 1939. In so doing he delivered the first Elias Potter Lyon Lecture entitled, "The Role of the Fundamental Sciences in Medical Progress." He portrayed the inevitable dependence of progress in the applied clinical fields upon progress in all of the more basic natural sciences. He referred to the contributions of physicists in the development of the X-ray and referred to the fact that Professor W. B. Cannon, who took part in the scientific program of this celebration, had been the first to apply the X-ray to a study of physiology and ultimately medicine. He pointed to the discovery of radium, the development of sensitive galvanometers and numerous other physical advances in relation to their importance to clinical medicine. He referred to the contributions of organic chemistry in the fields of nutrition and endocrinology, to the contributions of comparative zoology to our understanding of numerous diseases. In a word, he characterized science as one interdependent whole in which the applied sciences such as medicine derive their vitality from progress in fields which may seem to be far removed but which are in reality their immediate foundation stones. Dr. Carlson took occasion to refer to the vital importance of maintaining unhampered, opportunities for investigations on lower animals. He alluded to the ever present danger of the influence of the so-called anti-vivisectionists, who for false sentimental reasons would have all experimentation on animals abolished. He said that it behooved every member of the medical profession and every intelligent layman who valued the contribution of medical science to human welfare to be forever on the alert against the encroachments of this misguided anti-scientific group which one finds in variable number in every community.

The final evening meeting was a banquet of alumni and interested friends of the medical school held in the ballroom of the Minnesota Union. A sizeable proportion of the alumni of the Medical School of the University of Minnesota gathered to celebrate the achieve-

ments of the first half century and in particular to lay plans for the future. Dr. Harold S. Diehl, dean of the medical sciences, spoke briefly on "The Medical School of the University of Minnesota in Retrospect and Prospect." Although he enumerated the accomplishments of the past, he emphasized particularly the needs for the present and the future. He said that although it was the obvious responsibility of the state to provide the basic essentials for sound medical education, there was a rare opportunity for private funds to convert what might otherwise be just a good medical school into a great one.

The Herman M. Johnson Lecture of the Minnesota State Medical Association was delivered by one of the most distinguished alumni of the University of Minnesota Medical School, Dr. O. J. Hagen, from Moorhead, who was graduated in 1906. Dr. Hagen spoke on the subject, "The Medical School from the Point of View of the Alumni." He paid fitting tribute to the pioneers whose work has left its mark on the medical school and the profession of the state of Minnesota. He expressed the gratification of the alumni over the development of a productive center of medical investigation and teaching in this university and pledged the continuing support of the great body of its graduates.

An address on graduate medical education to have been delivered by Dr. Donald C. Balfour, director of the Mayo Foundation of the University of Minnesota, was read in his unavoidable absence by Dr. Louis B. Wilson, who gave distinguished service for so many years in the same post. Dr. Balfour stressed the growing importance of intensive graduate education in the various branches of medicine. He referred to the requirements of the various specialty boards as evidence that the University of Minnesota, in its Minneapolis and Rochester branches, had begun to render the type of service whose importance is even now impossible to evaluate completely. Dr. Wilson contributed interesting reminiscences of research and teaching in the earlier years of the history of this medical school.

Dr. George Earl, president of the Minnesota State Medical Association, presented the distinguished service award of the association, posthumously, to Dr. William J. Mayo, Dr. Charles H. Mayo and Dr. Herman M. Johnson.

Professor Richard E. Scammon discussed in a very scholarly way, "Progress in Medical Education on the American Scene," with his characteristic vivid and astute analysis. Dr. Scammon traced the growth of the movement toward independence in educational and scientific matters on the American continent. He referred to the important contributions of the American colonials and the birth in the early years of the nineteenth century of a vigorous American school. He referred to the ever increasing relative importance of American medicine to world progress.

The highlight of this alumni gathering was the announcement by Dr. J. C. Litzenberg, as the representative of a committee of the Medical Alumni Association of the University of Minnesota, of the establishment of the Minnesota Medical Foundation. Dr. Litzenberg characterized the setting up of this foundation as the greatest single contribution ever made to the medical school of the university. He referred not to its economic value, now or even eventually, but to the influence which the alumni of that medical school would be able to exert upon it and in its behalf through the years to come through the agency of that foundation. Dr. Litzenberg reported that some months ago, the officers of the University of Minnesota Medical Alumni Association had appointed a committee of seven members to consider and report plans for integrating the interests and activities of the alumni and the medical school from which they were graduated. After much labor, this committee recommended and was authorized to proceed with the formation of what they decided to call the Minnesota Medical Foundation, in whose articles of incorporation appears the following statement of purpose, "The object and purpose of this corporation is and shall be: to promote the welfare of the community by the coöperation of alumni and friends of the Medical School of the University of Minnesota in improving the undergraduate, graduate and research functions of that Institution; to establish scholarships, lectureships, professorships, research and student loan funds in that institution; to publish and promote the publication of a representative medical Bulletin; and in general, by all legitimate and usual means, to advance the interests of the University of Minnesota Medical School and its alumni, without consideration for benefits bestowed."

The committee which has been responsible for the organization of this Foundation has believed that the alumni and friends of the Medical School of the University of Minnesota could implement their interest in that institution by providing a corporation independent of the State University, itself, but with the function, as outlined in the quotation above. Over the course of time there can be little doubt that this Foundation can exert a very healthy influence in the support of those projects which, as Dean Diehl pointed out earlier in the evening, make the difference between a good and a great institution. Dr. Litzenberg reported that without solicitation, this Foundation had already received a number of substantial gifts. Dr. Litzenberg announced that there would be three classes of voting membership in the corporation and that each member would have equal representation. These classes are (1) Foundation Associates, who shall be persons contributing $1000 or more to the Foundation; (2) Life Members, who shall be persons contributing $100 or more to this Foundation; and (3) Annual Members who shall be persons contributing annual dues in an amount to be fixed in the by-laws.

In presenting this Foundation of alumni and friends of the medical school, Dr. Litzenberg expressed the belief that there was a very large number of persons in the community who would welcome the opportunity if it were presented to them of investing funds, small or large, in the greatest endowment which the human race knows, that store of knowledge which can be used to spare mankind from the pain of unnecessary disease, in fact the only store which neither wars nor revolutions can destroy.

The Genesis of Appendicitis in the Light of the Functional Behavior of the Vermiform Appendix*

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OUTLINE

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II. Theories of origin of appendicitis.
III. Our investigations.
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D. The nature of the fluid secreted.
E. Observed histologic reactions in obstructed appendixes which secrete fluid.
IV. Revision of pathologists' concept of appendicitis necessary.
V. The origin of appendical obstructions.
A. Nature of fecaliths.
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VIII. The frequency of appendicitis.
IX. Necessity for revision of the clinician's concept of appendicitis.
X. Need of revision of indications for excision of the vermiform appendix.
XI. Summary.
XII. Conclusions.

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IT is indeed a high honor to be invited to deliver a Lewis Linn McArthur Lecture under the Frank Billings Foundation—a privilege of which I am deeply conscious and appreciative. Doctor McArthur's great interest in and contributions to the appendicitis problem suggested the subject of this lecture as a suitable one for discussion this evening.

That an important problem demanding solution exists with reference to the vermiform appendix is apparent in the persistently high mortality of diseases of the appendix. In the United States alone 16,000 to 18,000 persons have died each year of appendicitis. The average mortality during the last five year period has been 17,114 deaths per year. As a matter of fact one of the highest reported mortalities of the disease in the world is reported for the United States (table 1). This is the more to be lamented in that it was the observation of an American, the brilliant Reginald Fitz[1] of Boston, which established definitely a causative relationship between affections of the vermiform appendix and suppurations in the right lower quadrant of the abdomen, theretofore commonly called perityphlitis. Furthermore, it was Charles McBurney[2] of New York who was the first to advocate excision of the appendix early in the acute attack, which practice John B. Murphy[3] of Chicago endorsed independently soon thereafter. In England we find the late Sir Frederick Treves[4] as late as 1902 (as a matter of fact, in the very week in which he operated upon King Edward VII who was awaiting coronation) insisting there was no disease in the appendix until the peritoneum was involved and that five days should elapse following the onset of the attack before the surgeon intervened. Despite the somewhat dilatory acceptance of early operative intervention for acute appendicitis in England, their achievement with the problem of appendicitis is far better than our own.

Leonardo da Vinci said that the supreme misfortune which can befall a man is when theory outstrips performance. This ill fortune appears to have overtaken the American surgeon in dealing with appendicitis, for whereas the technic of removal of the appendix in experienced hands has attained a standard of completion difficult to improve upon, yet an unwarranted and unaccountably large mortality still continues. The same problem, though in somewhat lesser degree, confronts surgeons everywhere. How can the dismal showing of table 1 be improved upon?

THEORIES OF ORIGIN OF APPENDICITIS

The observations of Volz,[5] Matterstock,[6] and Fitz[1] in the nineteenth century stressed mechanical causes as the principal etiologic agents of appendicitis. In the

TABLE 1

Deaths from Appendicitis per 10,000 of Population from Various Countries of the World

(Taken from Statistisches Jahrbuch für das Deutsche Reich 1937, p 30, under section of internationale übersichten)

Year	Country	Deaths per 10,000 Population	Year	Country	Deaths per 10,000 Population	Year	Country	Deaths per 10,000 Population
1934	Canada	1 5	1935	Belgium	8	1933	France	4
1934	United States	1 4*	1934	Germany	8	1935	Hungary	4
1935	Switzerland	1 3	1935	Great Britain	8	1934	Japan	.4
1933	Sweden	1 0	1935	Italy	7	1934	Greece	3
1934	Union South Africa (Whites only)	1.0	1935	New Zealand	7	1933	Spain	3
1935	Australia	.9	1934	Norway	.7	1934	Portugal	2
1935	Denmark	9	1935	Netherlands	5	1934	Uruguay	2

*Mortality for United States in 1935 is 12 6 per 100,000 population (Mortality Statistics 1935 United States Census 16,142 deaths from appendicitis—estimated population July 1, 1935, 127,521,000)

TABLE 2

Mucosal Folds About the Appendical Orifice*

Folds Present on Superior and Inferior Cecal Wall	Number of Specimens	Per Cent	
Gerlach's mucosal fold	183	34 8	
Gerlach's and one semilunar mucosal fold	147	27 9	
Gerlach's and two semilunar mucosal folds	82	15 6	
Gerlach's and three semilunar mucosal folds	1	2	
Gerlach's and Nanninga's mucosal fold	16	3 0	
Total with Gerlach's mucosal folds		429	81 5
No folds about the orifice	89	16 9	
No Gerlach's fold; one secondary mucosal fold	1	.2	
Longitudinal mucosal folds	5	1 0	
Complete ring	2	.4	
Total without Gerlach's folds		97	18 5
Total orifices		526	100 0

*Mucosal folds about the appendical orifice of 526 adult and fetal cases, or 77 92 per cent of the total series of 675 specimens

meanwhile a host of other suggestions have been made concerning the origins of appendicitis, and new factors of latitude, longitude, diet, and habits of life have come to be considered as important items in the genesis of the disease. There are those who insist that appendicitis is solely a question of geography, diet, and culture. On the other hand an even larger group, counting amongst its number men accorded first rank among medical investigators, affirms that appendicitis is entirely infectious in nature. Of the group who contend that appendicitis is exclusively of bacterial origin, those who held to its hematogenous origin have been succeeded in turn by those who contended that swallowed organisms from the nasopharynx lodged in the appendix and gave rise to inflammation. Aschoff, whose opinions and expressions command attention always, has gone so far as to assert that appendicitis is a specific bacterial disease (not unlike gonorrhea in its specificity) due to the enterococcus type B of Gundel. This organism Aschoff[7] finds as a usual inhabitant of the distal third of the normal appendix. The proximal two-thirds of the appendix he finds has a mixed bacterial flora not unlike that of the cecum. What the provocation is which causes these organisms lurking in the terminal recess of the appendix to become invasive, Aschoff fails to describe.

This dilemma over what the nature of appendicitis may be is of more than academic interest. The confused state of medical opinion with reference to the origin of appendicitis contributes unquestionably in no small measure to the mortality of the disease. Whereas a disease may be treated in an empirical fashion fairly successfully, an adequate appraisal of its nature lends invariably in the better understanding a tremendous impetus to the correction of defects in management. If the cause or causes of appendicitis were known, a more ready general acceptance by both medical profession and public would be found for advised therapeutic procedures. We can not confront the public with an intelligent program directed at solution of the appendicitis problem and gain its confidence while our ideas of the origin of the disease are in so chaotic a state.

OUR INVESTIGATIONS

Mindful of the paucity of specific infections in the intestinal canal and the bad relationship structurally of this narrow diverticulum to the remainder of the intestinal canal, the writer set out five years ago to reinvestigate the obstructive causes which had been emphasized by Fitz and accepted by van Zwalenburg[8] and Wilkie[9] but which had become set aside virtually by the cogent declarations of Aschoff. In these investigations I have had the helpful assistance of many willing associates. It is a pleasure to acknowledge here the impetus which this project has had from W. F. Bowers, R. E. Buirge, C. Dennis, W. P. Ritchie, B. A. Smith, Jr., and R. L. Varco. This lecture is in effect a brief summary of those joint labors,[10,11,12] some of which observations have been described already while others are in process of being published.

TABLE 3

Incidence of Obscuration of Appendical Orifices by Mucosal Folds

	Hidden	Partially Hidden	Not Hidden	Total
Fetal	0	0	57 (100.0%)	57
Others	57 (12.3%)	77 (16.5%)	331 (71.2%)	465
Total	57 (10 9%)	77 (14 8%)	388 (74 3%)	522

TABLE 4

Classification of Cecums

	Number	Treves' Type I	Treves' Type II	Treves' Type III	Treves' Type IV
Fetal	63	63			
Term — 1 year	25	20		5	
1 — 10 years	12	5		6	1
11 — 20 years	7	1		5	1
21 — 30 years	9	1		8	
31 — 40 years	16	1	1	13	1
41 — 50 years	33	3	1	26	3
51 — 60 years	37	7	1	27	2
61 — 70 years	33	2	2	25	4
71 — 80 years	23	2		18	3
81 — 84 years	4			4	
Total	262	105 (40 1)	5 (1 0)	137 (52.3)	15 (5.7)
Fetal	63	63 (100 0)			
Term — 84 years	199	42 (21 1)	5 (2 5)	137 (68 9)	15 (7.5)
Term — 10 years	37	25 (67 6)		11 (29 7)	1 (2.7)
11 — 84 years	162	17 (10 5)	5 (3 1)	126 (77.8)	14 (8 6)
Treves	100	(2 0)	(3.0)	(90 0)	(5.0)
Berry	100	(10 0)	(6 0)	(80.0)	(4.0)

1. ANATOMY OF APPENDICITIS

Gerlach's valve.—In 1847 Gerlach[13] related the instance of a boy of 15 with abdominal pain to whom he administered castor oil in repeated doses and later enemas. At necropsy, perforation of the vermiform appendix at its base was found. There was a fecal concretion in the lumen of the appendix beyond the site of perforation. On opening the cecum the author found a mucosal fold overlying the appendical orifice. In 9 necropsies such a mucosal fold was observed 4 times; it was absent in 5. Much debate has hedged about the significance of the observations of this fold. The painstaking German anatomist Toldt[14] recognized this mucosal fold and it has come to be known as Gerlach's valve. In the main, both anatomists and clinicians, however, have discredited it largely as having any importance. Lafforgue[15] examined 200 cadavers and found a fold much as described by Gerlach two times. In 27 fetuses it was not observed. Colley[16] failed to find Gerlach's fold overlying the appendical orifice in 152 necropsies and referred to its presence as a myth. Oberndorfer[17] denies it any significance, but Hansemann[18] believes it plays some role in the genesis of appendicitis.

Our own observations (Buirge and Wangensteen[11]) are summarized in table 2. It is to be noted that one or more mucosal folds overlay the appendical orifice in 81.5 per cent of cases. These folds are observed usually in the superior cecal wall. The primary fold overlying the appendical orifice is referred to in table 2 as Gerlach's fold.

The extent to which obscuration of the appendical orifice occurred through the agency of mucosal folds is indicated in table 3. It is to be noted that in all fetal specimens there was direct continuity between appendical lumen and cecal cavity. The majority of appendical orifices (80 per cent) are less than 6 mm. in diameter. A large number of specimens in which these folds were prominent were subjected to microscopic examination to determine whether muscle fibers continued into the fold. In only three instances (all fetal specimens) was circular muscle projected definitely into the fold. It is apparent, therefore, that Gerlach's fold in the adult has none of the characters of a musculosphincteric valve.

My interpretation of the import of Gerlach's valve is that its purpose is to interfere with or preclude filling of the lumen of the appendix. I do not believe that it can interfere with emptying.

Musculature of the appendico-cecal junction.—Histologic study of blocks 1 cm. in length cut from the appendico-cecal junction failed to disclose any evidence of a sphincter muscle at the site of union of appendix and cecum. A distinct thickening, however, of the circular muscle on the medial or ileal side of the appendico-cecal union was observed in 59 per cent of 250 specimens subjected to careful histologic study, which occurrence may suggest a "signet-ring" type of circular sphincter.

A variable diminution of muscle fibers continues over to the appendix from the cecum. The dispersion of the longitudinal fibers of the Taenia coli over the appendix was studied with a microdissector in 18 cases. Longitudinal muscle bands divide themselves into three layers, superficial, middle, and deep. The deep fibers attach themselves rather intimately to the circular fibers at the apex of the cecum. The decussation of the longitudinal

cecal bands about the appendix is a variable phenomenon. In somewhat more than half the cases this decussation occurs in an iris diaphragm-like manner about the base of the appendix.

Type of appendico-cecal union.—In 1885 Treves[19] studied the external form of the appendico-cecal union and established four general types. Berry[20] and Jacobshagen[21] have employed this grouping also. A summary of the type of appendico-cecal union observed in 262 specimens, 63 of which were from fetuses, is shown in table 4. It is to be noted that all the fetal appendixes and the majority of those from patients below one year of age fell into type I in which the appendix constitutes the true center of the cecal apex and a funnel shaped continuation of it. The type II cecum is similar to type I except that the cecum is sacculated evenly on both sides and there is not, as in type I, a gradual fusion of the lumina of appendix and cecum, but on the contrary, a sudden transition from the one into the other. In type III the site of appendico-cecal union is forced far medial to the left toward the ileo-cecal valve because of the greater sacculation on the lateral aspect of the cecum. In type IV the sacculation on the lateral aspect of the cecum has become so great that the medial wall of the cecum is practically absent, in consequence of which the base of the appendix comes to lie near the termination of the ileum.

Lymphoid tissue and glands of the mucosa.—No detailed study of the distribution of the mucosal glands or of the lymphoid tissue in the vermiform appendix has as yet been undertaken in this clinic. The lymphoid tissue in particular has been the subject of many inquiries, and considerable information is available relating to the lymphoid structure of the appendix. The vermiform appendix of man has been referred to frequently as the tonsil of the abdomen. It has been said to contain as much lymphoid tissue as the entire colon exclusive of the cecum. The lymphoid follicles have been estimated by Liebeck[22,23] to occupy 30 per cent of the mucosal surface of the appendix, the variation lying between 8.2 and 52.8 per cent. According to Berry and Lack[24] the lymphoid follicles do not make their appearance until shortly after birth. In the section of fetal appendixes in which the musculature of the appendico-cecal union was studied, lymphoid follicles were encountered now and then, however. Nagoya[25] noted that the development of the lymphoid tissue in the appendix was fairly complete at the end of the second month of life. It attained its maximum growth between the eleventh and sixteenth years, a little later than that of the lymphoid tissue of the rest of the body. In the main, sections of the distal portion of the appendix, Nagoya found, exhibit more lymphoid tissue than do sections from the middle or proximal portion. Yet we have the impression that as far as persons of advanced years are concerned that the lymphoid tissue is present in lesser amounts toward the tip. Nagoya has counted as many as 42 lymph follicles in a circular section of the appendix from an 11 year old child. In the appendix of a man of 72 years, as few as two or three follicles were noted in a section, corresponding quite closely with the number present in infants of four to six weeks of life. Nagoya estimates that at the extremes of life the lymphoid tissue in the appendix approximates in amount only a twentieth of that when its development is maximal in the late adolescent years.

The lymphoid tissue of the appendix is not alone submucosal in location but extends often well into the mucosa, being covered by a very thin layer of epithelium, and occasionally by none at all. The absence or virtual absence of mucosa overlying the lymphoid follicles accounts in all likelihood for the occasional presence of epithelial cells, lymphocytes, and leukocytes in the appendical lumen without evidence of ulceration of the mucosal layer.

The status of the glands of Lieberkühn lining the appendical mucosa parallels quite closely that of the lymphoid follicles. The greatest number of glands Nagoya observed in specimens from the eleventh to the sixteenth years, when the growth of lymphoid tissue was greatest. In contrast with the distribution of lymphoid tissue, Nagoya observed the glands of Lieberkühn to be more numerous in the middle than in the distal segment of the appendix. In the appendix from a 16 year old child Nagoya counted 140 glands in a circular section from the mid portion and 95 in a section from the distal segment. The glandular development of the mucosa is fairly complete in infants at 5 to 6 months of life. A section of the appendix of a 7 months old fetus exhibited only 7 glands; that of a 72 year old man 20 glands.

Luminal capacity of the appendix.—The volume of the lumen of the appendix is surprisingly small (Dennis and Wangensteen[11]). In appendixes which were not obstructed the measured luminal capacity in a number of specimens at 20 cm. of water pressure did not exceed .23 cc.; at 60 cm. pressure the highest luminal capacity was .7 cc. When the luminal capacity was measured at 100 cm. of water pressure, the volume was found to be correspondingly greater. The volume of appendixes recovered at postmortem in which the resistance to luminal perfusion is absent is, of course, greater.

An attempt was made to establish the breaking strength of the normal appendix, excised coincidentally during the course of an abdominal operation. It was found that none of three such appendixes could be ruptured by pressures as high as 2400 cm. of water (approximately 2.3 atmospheres) directly following excision. In this process a stretch of luminal capacity to about 5 cc. occurs. Gangrenous unruptured appendixes were found to break at very low pressures—one at 20 cm. of water and another at 70 cm. The presence of an inflammatory reaction in the appendical wall decreases its strength tremendously.

Reference will be made subsequently in this paper to the cecal appendage of the rabbit. It has a larger luminal capacity than the vermiform appendix of man and its wall is considerably thinner. Its breaking strength was found to be only 120 to 150 cm. of water. This point should be kept in mind with reference to the secretory capacity of the cecal appendage of the rabbit and its behavior under conditions of obstruction.

TABLE 5

Resistance to Intraluminal Outflow*

	No. of Cases	Centimeters of Water Pressure Sustained Average	Median	Maximum	Minimum
1. Normal	11	38 0	28	110	16
2. Interval	45	54.4	45	130	16
3. Acute	27	73.0	68	120	12**
4. Normal from cadavers	13	2.9	3	7	0

*This table also contains pressure determinations made upon the excised appendix directly after removal.

**This appendix was infested with pinworms; the next lowest readings in this group were four cases with readings of 30 cm.

TABLE 6

Resistance of the Appendix in Patients with Appendicostomy to Intraluminal Outflow

No. of Cases	Centimeters of Water Pressure Sustained Average	Median	Maximum	Minimum
12	47.7	42.0	100.0	8.75

2. PHYSIOLOGICAL BEHAVIOR OF THE APPENDIX

Resistance to luminal outflow.—When a needle is inserted through the distal end into the lumen of the vermiform appendix a resistance to inflow of fluid is encountered. The order of magnitude of this resistance is indicated in table 5. It is to be noted that vermiform appendixes removed from cadavers exhibit practically no resistance to luminal perfusion. It was highest in the acute appendixes, less in the interval group, and lowest in the normal appendixes.

It was observed that excised specimens directly after removal exhibit the same or even greater grades of resistance to outflow as in situ with the mesentery intact. If, however, the appendix is left in a container at room temperature, in 30 or 40 minutes the resistance to luminal outflow becomes minimal. This property is preserved, however, if the appendix is kept in the icebox at a temperature maintained between 2 and 7 C. The pressure in appendixes so treated, however, is about one-third of that obtained immediately postoperatively. When the appendix is excised it shrinks in length. There appears to be a fairly direct correlation between the grade of shortening and the increase in resistance to luminal outflow after excision. This resistance to luminal outflow persists after amputation of successive segments, indicating that resistance to luminal outflow is a property of each and every segment of the appendix and represents, in fact, the resistance of the circular muscle of the appendix to distention. The resistance to inflow is of the same order of magnitude as resistance to outflow.

Appendicostomy studies.—(a) Resistance to luminal outflow and suggestion of fluid secretion: Appendicostomy was established in a group of 17 cases. The majority of these had colostomy performed for carcinoma of the colon, appendicostomy being done coincidentally. Table 6 indicates that the resistance to luminal outflow is essentially of the order of magnitude of that found in the interval and normal groups in table 5. It was observed that 1 to 2 cc. of fluid could be collected daily from an unobstructed appendicostomy through a small catheter (no. 8 French urethral) tied into the lumen of the appendix. It was noted also that pressures as high as 60 cm. of water could develop in an unobstructed appendicostomy. The latter finding in particular suggested that the vermiform appendix of man secreted fluid probably. In the collection of fluid through an inlying tube, however, it could not be gainsaid that the fluid came from the cecum. Proof of the origin of this fluid from the appendical lumen will be cited presently.

(b) Injection of bacteria: Placement of bacteria recovered from instances of acute suppurative appendicitis into the lumina of appendicostomies appeared to be tolerated without giving rise to symptoms. In the light of Aschoff's contention relating to the specificity of the infection in appendicitis one might have expected some febrile response or evidence of reaction. None was observed.

(c) Retention of foreign bodies: A single bird-shot (no. 9) was placed in the lumen of several appendicostomies. One was extruded into the colon with evidence of pain within two hours, as indicated by a roentgen film. In one instance the shot was retained for two months. Twenty-four to thirty-six hours was the more usual length of retention. Occasionally the shot was expelled through the external stoma onto the dressings.

(d) Spectrographic evidence of barium retention: The retention of barium by the appendix after the administration of barium enemas was studied on excised appendixes by a spectrophotometric method. The barium lines in the spectrum are to be found at 4554 and 2332 Angström units. In 13 appendixes removed from 6 to 790 days following the administration of a barium enema, in which the appendix was not visualized by roentgenologic examination, all failed to show spectrophotometric evidence of barium. In four other instances in which the appendix was visualized by roentgenologic examination and removed by operation after intervals of 10, 13, 93, and 257 days following the barium enema, no spectrographic evidence of barium retention was found. In six other specimens, however, in which the appendix has been visualized on roentgen examination from eight hours to six days prior to appendectomy, barium was detected by the spectrophotometric method in all. The approximate concentration of barium in the luminal contents of these appendixes varied from .05 to 10 per cent.

TABLE 7

Comparative Mortality Amongst Whites and Negroes in United States from Appendicitis 1911-1935
(Averages of annual death rates per 100,000 by color, sex, and age. Ages 1 to 74 years)*
Metropolitan Life Insurance Company, Industrial Department, 1911 to 1935.

		Death Rates per 100,000					
		MALES			FEMALES		
	Age Period (Years)	1911 to 1935	1931 to 1935	1911 to 1915	1911 to 1935	1931 to 1935	1911 to 1915
White	1 to 74	14.8	15 5	12.9	10.9	10.7	10.1
Colored	1 to 74	15.3	16.1	13 6	13 8	13 3	11.1

*Twenty-five Years of Health Progress: by Louis I. Dublin and Alfred J. Lotka, 1937.

TABLE 8

Leading Causes of Death in Certain Age Groups in Massachusetts*
(Annual average number of deaths, 1931-1935)

1 — 4 Years		5 — 9 Years		10 — 14 Years		15 — 19 Years	
Pneumonia	271	Automobile accidents	70	Heart disease	65	Tuberculosis	121
Tuberculosis	57	Pneumonia	64	Appendicitis	44	Heart disease	75
Ear, nose and throat	49	Appendicitis	47	Pneumonia	37	Pneumonia	53
Automobile accidents	48	Heart Disease	47	Automobile accidents	37	Automobile accidents	53
Appendicitis	43	Ear, nose and throat	43	Drowning	32	Appendicitis	42

*Public Health Laws and Policies in Massachusetts, 1936.

In patients who were known not to have had barium for roentgen examination at any time, the removed appendixes and their contents gave no trace of barium by this method of examination.

3. Proof of the Secretory Activity of the Vermiform Appendix

Method.—The pressure tracings made upon unobstructed appendicostomies of man, in which gradual increases of intraluminal tension to as high as 60 cm. of water were noted, suggested that the appendix secreted fluid.[11] We were somewhat reluctant to establish a direct experiment in which the base of the exteriorized appendix was ligated, but over a period of many months a suitable technic was worked out. In the first few instances a Bloch-Mikulicz type of operative exteriorization was done upon the terminal ileum and proximal colon for carcinoma of the ascending colon. The blood supply of the entire exteriorized segment was left intact, and after the early operative convalescence had been safely made the base of the appendix was ligated. The occurrence of intermittent pain with fever and leukocytosis was noted and the increasing distention of the appendix could be kept under constant observation. Incannulation for recording pressure effects graphically was done also. The process was not allowed to go on to spontaneous perforation of the appendix—the entire exteriorized segment being removed with the cautery when the necessary information had been obtained.

Our experience with this type of procedure appeared to suggest that the initial premise of secretory behavior on the part of the appendix was correct. Gradually a technic of sewing the base of the cecum to the anterior abdominal wall and ligating the base of the appendix, at the time that colostomy was done for carcinoma, was worked out. These experiments will be summarized briefly presently. Here it might be said that no patients came to harm through the performance of appendicostomies which were obstructed. Obstructed appendixes were not allowed to go on to perforation, and when the secretory behavior of the appendix had been determined satisfactorily, the closed recording system was broken and secreted fluid was collected by means of an inlying cannula in the tip of the appendix in a small Wassermann glass tube at atmospheric pressure. On completion of all the necessary operative procedures for the primary surgical condition, an extraperitoneal excision was made of the appendix if it continued to secrete. The skin grows over unobstructed appendicostomy openings quite quickly if the appendix is cut off flush with the skin.

Secretory behavior of the cecal appendage in animals.—During the period that a satisfactory and safe method was being evolved of obstructing appendicostomies in man, the behavior of the cecal appendage in a large number of animals was determined. Bowers and the writer[10] had noted that obstruction of the cecal appendage of the dog was unattended by inflammatory reaction if the lumen of the appendage was washed out; if, on the contrary, obstruction was established when feces distended the appendage the development of an inflammatory reaction was the rule.

The next animal in which the secretory behavior of the cecal appendage was investigated was the rabbit. This appendage of the rabbit bears in form some similarity to the vermiform appendix of man. It is, to be sure, a vermiform appendix of the cecum of the rabbit, but its cecum is a long, blind pouch. Therefore some deny that the rabbit has a true vermiform appendix. Comparative anatomists who hold to this view insist that only man and the anthropoid apes—gorilla, orangutan, chimpanzee, and gibbon—have a true vermiform appendix.

(a) Obstruction of the cecal appendage in various animals: Obstruction of the cecal appendage was established in a large group of animals, none of which gave

ce of secretory behavior of this segment of the In the majority of this number, more than one l was available for most of the investigations, and st instances protracted graphic tracings were made : pressure relation within the obstructed cecal ap- ge. The list of these animals in which the cecal dage gave no evidence of secreting fluid or de- ing sustained intraluminal pressures under condi- of obstruction follows. Twenty-six species of ani- were studied:

Fowl: duck, goose, chicken, pigeon.

Carnivorous mammals: dog, red fox, cat, tiger.

Rodents: gray squirrel, striped gopher, rat, guinea pig, porcupine.

Domestic: hog, sheep, calf.

Monkeys: Marmoset, ring-tailed, macaque.

skunk, raccoon, and bear were explored but these ials had no cecal appendage. Dr. George A. Barnett Chicago kindly put at our disposal several excised imens of the ileo-cecal segment from various animals. walrus and baboon (Doguera type) were found to vithout a cecal appendage.

b) Obstruction of the vermiform cecal appendage of rabbit: A large number of observations of diverse ds have been made on the vermiform cecal appendage he rabbit. Ligature of the base has been followed by ture as early as 3½ hours after the establishment of truction. The majority of animals (75 per cent) er 10 hours will exhibit perforation. A gangrenous ocess was observed quite constantly in animals in which struction had been present for 8 hours.

Incannulation of the rabbit's vermiform appendage is lowed almost invariably by a fairly high secretory essure, far more constantly than in man's appendix, in hich occasionally no evidence of secretory pressure is served. Pressures of 60 to 70 and occasionally 90 cm. water are the rule. The highest sustained pressure served in the rabbit is 136 cm. of water, 10 cm. higher an the highest pressure in man.

In an earlier publication the impression was lent, on ie basis of a much smaller series of animals, that the dministration of cathartics caused earlier perforation, nd probably through the agency of increased secretion was reasoned. As a matter of fact, a larger series hows that the amount of fluid secretion in the obstruct- d vermiform appendage of the rabbit is not significantly lifferent from the obstructed control without adminis- ered cathartic or hypertonic intravenous saline solution. Further, the time of perforation is dubiously accelerated by the administration of cathartics. The hazard inherent n their use appears to lie in breaking a seal which the perforated vermiform appendage has established with adjacent tissues; cathartics in augmenting contractile ac- tivity of the gut preclude sealing of the perforation and enhance the danger of a wider spread of the spilled con- tents from the obstructed lumen.

Wells[26] of London concludes with reference to the rabbit as follows: "Obstruction to the lumen of the ap- pendix does not, in the rabbit, cause appendicitis. Such a procedure will under certain conditions cause a mu-

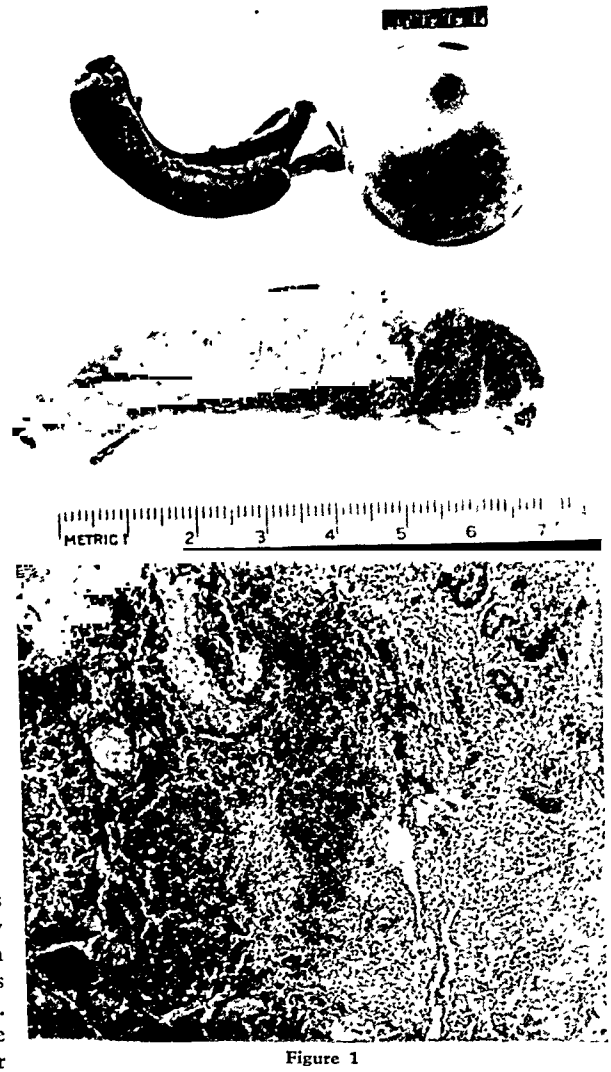


Figure 1

(a) Method of collecting fluid from the vermiform cecal appendage of the rabbit in a condom-type of balloon in the peritoneal cavity. Note the lack of reaction in the appendage.

(b) The appendage of another rabbit that perforated somewhat more than 5 hours after obstruction. Note the site of perforation near the mesentery.

(c) Histologic reaction in rabbit's appendage, 6 hours after the establishment of obstruction. Section taken from near the site of rupture. A cellular invasion of the entire wall, largely polymorphonuclear in character, has occurred. The mucosa has been lost in part by ulceration.

cocele of the appendix. Obstruction of the lumen of the appendix, when the mucous membrane is damaged, is always followed by acute inflammation of the appendix and death of the animal. It is immaterial whether the obstruction is produced by a ligature or by a foreign body."

Well's interesting experiments received favorable comment in an editorial in the *Lancet*.[27] The fallacy of Wells' work lies, however, in his failure to open his animals early after the establishment of obstruction. Wells established obstruction in ten rabbits without ligating the vessels. In eight of these "at about the end of the second week in every animal a lump was felt in the abdomen." Two of the ten died three days after op-

eration with an acute appendicitis and peritonitis. Wells explains this occurrence in the following manner: "It seems reasonable to suppose that there was some lesion of the mucous membrane, pre-existing or more probably accidentally imposed at the time of operation."

(c) Secretory capacity of the vermiform appendix in anthropoid apes: Two species of anthropoid apes were available for investigation, namely, two gibbons and three chimpanzees.* The gibbon was found to have an infantile type of vermiform appendix. The luminal stretch determined under measured pressures, however, was about twice that of man, indicating a thinner muscle layer. A satisfactory tracing was made in both gibbons, the pressure recordings extending continuously over about 48 hours in each animal. One developed a maximal intraluminal pressure of 18 and the other 19 cm. of water. In neither instance was the maximal pressure sustained for long. Neither appendix exhibited histologic evidence of leukocytic invasion of the walls of the appendix. Serositis of the exteriorized segment was, of course, present. These sections constituted excellent controls in that no leukocytic invasion of the appendical wall attended incannulation when a sustained secretory pressure failed to develop.

One of the three chimpanzees died of a mucous plug in the trachea about ten hours after the start of the experiment. An extensive tuberculosis throughout lungs and peritoneum was observed at necropsy. The intraluminal pressure in the appendix during these ten hours had built up to 42 cm. of water pressure. Microscopically, diffuse leukocytic invasion of all the walls of the appendix was observed. In the instance of one chimpanzee the highest pressure recorded was 76 cm. This pressure was reached 20 hours after the start of the experiment and was maintained without further increase for 8½ hours. The pressure gradually fell then to 55 cm. and the experiment was terminated by excision of the vermiform appendix 33 hours after the experiment was begun. Microscopically, rupture was found in the proximal portion which was beneath the skin. Fluid had seeped out with the occurrence of rupture, accounting for the fall in pressure. The typical picture of leukocytic invasion of all the layers of the appendical wall was observed on histologic study. The luminal stretch under measured pressures of the intact appendix at the beginning of the experiment was about the same as in man.

The third chimpanzee built up an intraluminal pressure of 106 cm. of water 36 hours after the start of the experiment. It was maintained for three hours when gross rupture with escape of fluid occurred. The microscopic picture of a diffuse leukocytic reaction involving the entire appendical wall had been produced by the secretory activity of the obstructed vermiform appendix. The appendixes of these three chimpanzees would fall into group 2 of Treves' classification with reference to the external form of the appendico-cecal union.

The spontaneous occurrence of appendicitis in anthropoid apes is well known[28] and has been discussed previously.[10]

(d) Obstructed appendicostomies in man: Twenty-two such procedures have been made during the last two years. In eight of these, a sustained pressure of less than 20 cm. of water was developed. In two of these eight no evidence of increased intraluminal pressure attended incannulation of the exteriorized obstructed appendix. Ligature of the base was made with fine plain catgut in each instance and it is possible that the occlusion was not secure enough to occlude the lumen completely. Yet, in the light of evidence of fluid secretion obtained in unobstructed appendicostomies, this does not appear to be a cogent explanation. In nine instances sustained pressures in excess of 40 cm. of water pressure were recorded. In seven of these instances the pressure was sustained above 85 cm. There appeared to be no correlation between age and evidence of fluid secretion. The highest pressure observed, 126 cm. of water (approximating the systolic blood pressure), was noted in a man of 68. In another man of 70, 92 cm. of water pressure was developed within 14½ hours and was sustained for 7½ hours, at which time the cannula was withdrawn. In the remaining five appendicostomies, pressures intermediate between 20 and 40 cm. attended obstruction of the exteriorized appendix.

That the fluid accumulating in the appendixes of man, chimpanzee, and rabbit is a true secretion and not a filtrate is indicated by the high secretory pressure developed under conditions of obstruction. Also, the intraluminal pressure is higher than the tissue tension measured in the substance of the appendical wall directly after excision. If the fluid were a filtrate and not a secretion the reverse would be true, namely the tissue pressure would be higher than the intraluminal.

4. NATURE OF THE FLUID SECRETED

The tremendous secretory capacity of the rabbit's vermiform appendage has afforded an excellent opportunity for the collection of fluid. The voluminal capacity of the rabbit's cecal appendage at the time of bursting is in the neighborhood of 16 to 20 cm. Twenty cm. of fluid may be collected usually in about six hours time in an attached balloon allowed to remain in the peritoneal cavity. The fluid is thin and serous with free admixture of mucus. The pH of the fluid collected from the vermiform appendage of the rabbit when its base is ligated has varied from 8.78 to 7.12 and is usually distinctly on the alkaline side. Sucrase, maltase, and erepsin have been shown to be present not infrequently. Attending the intravenous administration of hypertonic saline solution, the digestion of egg albumin by fluid removed from an obstructed rabbit's vermiform appendage was noted, a finding which would suggest the presence of a more active proteolytic ferment than erepsin.*

*It is a pleasure to acknowledge here helpful suggestions from Dr. John F. Fulton, Sterling professor of physiology at Yale University, relative to the anesthesia problem in dealing with chimpanzees. I am deeply obligated to Mr. Fred M. Truax, commissioner of parks, playgrounds, and public buildings in Saint Paul and to his staff at the Como Park Zoo for invaluable help in prosecuting the studies on the functional behavior of the appendix of many of the animals listed and the apes mentioned here.

*When the influence of bacterial activity is ruled out, however, by Berkefeld filtration, it would appear that no enzymatic action persists.

The pH of fluid collected from obstructed appendixes in man was found to vary between 6.0 and 8.28 with a definite tendency to a lower pH than in the fluid from the rabbit. Mucin was found on all examinations and the presence of amylase and erepsin was demonstrated.

Insomuch as an active secretory behavior in the vermiform appendix is a wholly unexpected finding in the light of the usual concept of the function of this segment of the gut, it would be fitting if a morphologic answer would be forthcoming to account for this behavior. A careful histologic study of the appendical epithelium with differential stains would appear to be in order. Schmidt[29] a number of years ago called attention to the rather frequent occurrence of Paneth cells in the depths of the crypts of Lieberkühn. Their function is, however, yet not definitely known. It is possible that there may be ectopic secretory epithelium in the appendix, but it would appear more likely that the appendix may partake of the functional behavior of segments of the small intestine as far as secretion is concerned.

5. Observed Histologic Reactions in Obstructed Appendixes Which Secrete Fluid

This portion of the problem in itself is an undertaking of some magnitude. A review of this phase of the work has not been completed, but the varied structural changes observed in the architecture of the appendical wall in appendicitis developing spontaneously in man, it would appear, can be duplicated by luminal obstruction. The time element relates itself intimately to the character of the cellular reaction provoked. In the rabbits in which perforation followed within three or four hours after ligature of the base of the appendix, the resultant leukocytic reaction was minimal usually and concerned only the mucosa and the subserous coat. Whenever, however, perforation occurred only after the elapse of 10 to 14 hours, a gangrenous process with pronounced cellular reaction involving all the walls was observed. In the appendixes of man in which great increases of intraluminal pressure attended obstruction of the exteriorized vermiform appendix, erosion of the mucosa and an intense leukocytic invasion of all the walls occurred, largely polymorphonuclear in character. It has been mentioned already that a diffuse cellular reaction throughout the entire wall of the appendix was noted in the three chimpanzees, all of which developed sustained intraluminal pressures. In the gibbons, on the contrary, in which no evidence of fluid secretion was observed, the appendixes were normal histologically save for serositis attending the exteriorization. In rabbits, when the intraluminal pressure was not allowed to exceed 6 cm. of water by removal of successive increments of secreted fluid, histologic structural changes were not observed. In a number of instances in which the intraluminal pressure was allowed to rise to 20 cm. of water and maintain itself at that level, one acute diffuse process was observed in the wall on histologic study, in another gangrene occurred, and in one instance perforation was observed.

Gram-Weigert tissue stains made of the rabbit's vermiform appendage show that bacteria are present normally in the submucosal lymphoid tissue. That all lymphoid tissue may harbor bacteria under normal conditions is conceded quite generally. In the appendix of man bacteria were observed occasionally below the surface epithelium, but by no means as commonly as in the rabbit. Both Waetzold[30] and Bowers[31] have noted that bacteria may be demonstrated readily in the wall of the appendix if the excised appendix is not fixed immediately. Bowers observed a high incidence of bacteria in the tissues of the appendical wall of man in acute appendicitis. When one contemplates the anoxic effects of high (secretory) intraluminal pressures upon the tissues and the encouragement lent bacteria by this agency, as well as the disseminating force of increased hydrostatic pressure, it is apparent that the infective factor is invoked early by obstruction of the appendical lumen.

Much remains to be learned concerning the cellular nature of defence reactions in general—to this an evaluation of the early histologic processes observed in spontaneous appendicitis in man is no exception.

REVISION OF PATHOLOGISTS' CONCEPT OF APPENDICITIS NECESSARY

All pathologists with the exception of Aschoff and his followers concede freely that some cases of appendicitis have their origin, at least in part, on the basis of obstruction. In fact many pathologists would agree that a large number of cases of acute appendicitis are solely obstructive in origin. What the origins of those cases may be which fail to exhibit definite pathological evidence of obstruction is by no means a matter of common agreement.

Pathologists recognize essentially the following types of disease:[32]

1. Appendicitis in which the inflammatory reaction is limited to the mucosa (catarrhal, "primärinfekt").
2. A diffuse inflammatory process involving all the walls (diffuse, phlegmonous, ulcerative, gangrenous, perforative).
3. A subserosal perivascular leukocytic invasion which may occur independently or accompany mucosal lesions.
4. Healing phases of acute appendicitis, exhibiting granulation tissue reactions and lumen obliteration of varying grades, displacement of lymph follicles[7,33] into muscular and subserous coats, invasion and replacement of structure of appendical wall with fat and mucocele formation.

The more severe grades of appendicitis, such as diffuse leukocytic invasion of all the walls with attendant phlegmonous, ulcerative, gangrenous, or perforative changes, may all be reproduced experimentally by luminal distention. The lesser reactions in which leukocytic invasion is limited to the mucosa and subserosa are observed also in those instances of induced obstruction in which the secretory pressure does not maintain itself at a high level. Seng[34] has shown that there is a generous network of lymphatic vessels going out from the mucosa of the appendix directly to the subserous coat, a finding which is not uncommon apparently in the intestinal canal as a whole.[35] The occurrence of perivascular infiltration around the vessels in the subserosa following low in-

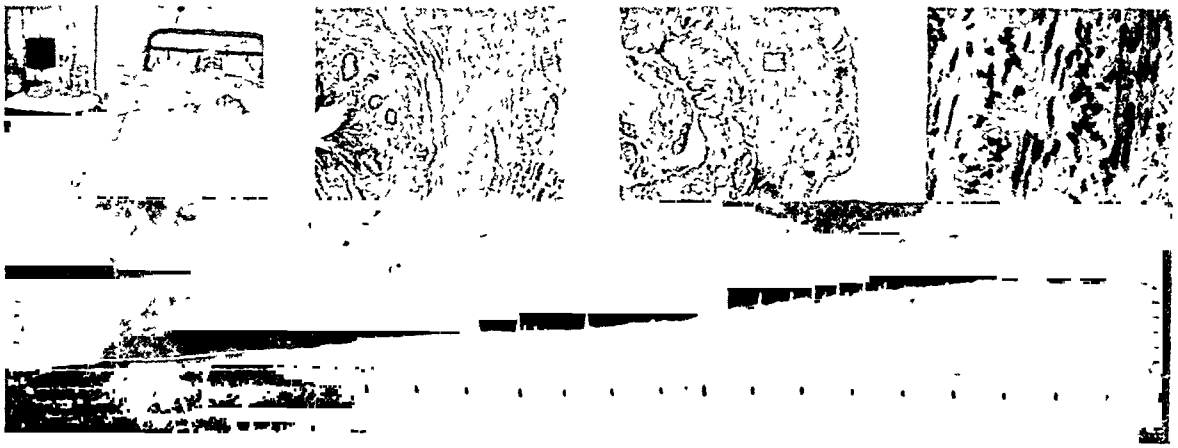


Figure 2

(a) Tracing being made upon Mr. T. W., U. H. No. 665959, aged 68. The appendix has been exteriorized and ligated at its base. The slope of the rise of the pressure is indicated on the smoked drum. The colostomy is shown on the left, and the patient is apparently quite comfortable.

(b) A control section from the distal portion of the appendix removed at the time of operation. (Magnification 60X).

(c) Section (magnification 30X) from portion of the appendix beneath the skin taken when cannula was removed, 22 hours after the establishment of obstruction; the pressure had risen to 126 cms. of water. There is a loss of some of the surface epithelium with free extrusion of cells into the lumen. There is a dense leucocytic invasion of the wall. It is to be noted that despite the presence of some fat in the submucosa that the secretory activity of the appendix was great.

(d) *Section through muscle shown in square in C, (magnification 500X). Note the polymorphonuclear* infiltration.

(e) The pressure tracing—the slope of the rising pressure is indicated. A pressure of 126 cms. water was reached 22 hours after obstruction.

creases of intraluminal tension in the appendix is understandable therefore.

The "primärinfekt" which Aschoff has described shades off on the one hand into a process of extension of epithelial cells through the goblet cells of the crypts of Lieberkühn, with occasional actual loss of the surface epithelium, on the other hand into leukocytic invasion of the appendical wall. The first is certainly a normal reaction. And whereas the collection of leukocytes in the appendical lumen, in which the appendix is otherwise grossly and histologically normal, is now and then considered as evidence of early acute appendicitis, it is *in all probability a normal occurrence.* We have observed it in the vermiform appendix of man and this occurrence was noted in the distal end of the appendix excised as a control section in a chimpanzee before obstruction and incannulation.

The migration of leukocytes through intact epithelial cells of the entire digestive tract is well known. Jassinowsky[36,37] has studied this phenomenon in the rabbit and finds that the migration of cells in all parts of the digestive tract other than the mouth (where it is essentially polymorphonuclear in character) is lymphocytic in type. The migration of lymphocytes into the appendical lumen he found to be the greatest per square unit of surface in the entire intestinal canal. By irrigating the surface with saline solution, he estimated that 14,500 lymphocytes per minute per square centimeter of surface were cast into the lumen. The desquamation of the surface epithelium was less intense in the appendix, where it was of the order of magnitude of 1,500 per minute per square centimeter of surface as contrasted with the ileum where it was 8,000 and in the upper jejunum where it was 7,300.

The character of this cellular migration we plan to study in appendicostomies in man.

From the studies which have been made upon the nature of the histologic reaction attending obstruction of the vermiform appendages of man, chimpanzee, and rabbit, it would appear that all the varieties of acute appendicitis recognized and observed by the pathologist may be produced experimentally by obstruction. The secretory pressure produces tissue injury and leukocytic invasion with pus formation and all the varieties of appendicitis observed clinically may occur in consequence.

The pathologists' reluctance to accept the obstructive origin for certain types of appendicitis is occasioned, in part, probably by failure to find an obstructive mechanism even though a thin wall and a dilated lumen speak forcibly for an obstructive origin. What may have become of the obstructing agent? If a fecalith, the possibility of its having become dissolved by the ferments of the secreted fluid and broken up by the contractions of the appendical wall would appear to be good, at any rate.

Further, amongst the gangrenous group in which no obstructive agency is found and micrometric studies of the wall show the latter somewhat thick and the lumen small, it is not unlikely that these findings may be occasioned in part by the lapse of time after extrusion or solution of the obstructing fecalith. For in the rabbit, anyway, if the obstruction is released in a gangrenous obstructed appendix (cutting the occluding ligature, which has been tied down, upon an encircling rubber tube), the findings described above are observed not infrequently.

THE ORIGIN OF APPENDICAL OBSTRUCTIONS

The small lumen of the appendix which exhibits normally a real resistance to outflow indicates how substances which enter the appendical lumen may find difficulty in leaving. In addition, kinks and sharp bends in the axis of this vermiform structure as well as retrocecal fixation may constitute physical handicaps to ready evacuation. Extrinsic bands and intrinsic strictures, the latter the result of previous ulceration extending well into the submucosa, likewise may obstruct the appendix. Appendicoliths and the lymphoid tissue of the appendix itself constitute probably the most important agencies in the development of obstruction.

Any infection in which swelling of the lymphoid tissue of the appendix occurs may bring about closure of the lumen. The appendical occlusions which occur during measles, scarlet fever, and other infectious fevers are likely to be brought about through such an agency.

Nature of fecaliths.—Appendicoliths are formed in situ in all probability within the lumen of the appendix. The best evidence of this is that many are so large that they could only with the greatest difficulty have been forced into the appendix from the cecum. Most appendicoliths contain a central nucleus of undigested cellulose. Neumann[38] claims that swallowed hairs constitute a common nucleus of appendicoliths. Schuberg[39] claimed at one time that the greater incidence of appendicitis occurring in men than in women could be explained on the basis of "beard-chewing." Beards and mustaches are no longer very common, yet appendicitis persists as a more frequent malady amongst men than women.

Appendicoliths may be hard and whitish or soft and brown in color. Mucus is undoubtedly an important constituent of an appendicolith. The lamination of appendical concretions which is quite constant is occasioned in all likelihood by the continued addition of mucus to the initial fecal body. The calcium which imparts hardness to the appendicolith arrives in the appendix from the main channel of the digestive tract, but is present also in the fluid secreted by the obstructed appendix.

In the series of acute cases of appendicitis studied recently by Bowers[31] from this clinic, a fecalith was found to be present in 67 per cent of the cases; in 16 per cent of this number there were multiple appendicoliths.

The appendicolith is undoubtedly the most important single agency in the genesis of obstruction of the appendical lumen. Only Aschoff and his followers deny it any significance. From the Friedrichshain Hospital in Berlin, Neumann reports having found appendicoliths in 544 out of 1847 excised appendixes (29.4 per cent). There were in this group 50 appendixes from children under 6 years of age. The incidence of appendicoliths in this group was 56 per cent and in 42.9 per cent of this number hairs were present in the appendical concretions. The German surgeon Riedel[40] accords the fecalith considerable importance in the genesis of appendicitis.

Filling and emptying of the appendix.—When the manner in which the appendix fills is understood better, the development of appendical concretions will be more intelligible. The mucosal folds exist over the appendical orifice probably to preclude entry of intestinal content into the appendical lumen. Fluid is secreted and may be collected from an unobstructed appendicostomy through its distal opening upon the anterior abdominal wall. Lead bird-shot placed in the appendical lumen may be extruded upon the anterior abdominal wall, but more often are expelled into the cecal lumen. Spectrophotometric studies upon excised appendixes, in which prior to operation administered barium was visualized within its lumen, have shown that barium may be retained by fairly normal appendixes for as long as six days. In stenotic appendixes barium may be retained for months.

Sir Arthur Keith[41] has described the cecocolonic sphincteric tract, a functional sphincter which he finds on the ascending colon about 5 cm. above the entry of the ileum into the cecum. Though not recognized by anatomists, a functional sphincter has been described at this site on the bowel by roentgenologists (Hirsch,[42] Biedermann,[43] Morse[44]). We have observed that the intraluminal pressure during digestion may be surprisingly high in this segment of the colon. Contractions upon a small balloon passed down into the cecum with a diameter of about 2 cm. when distended have been recorded with an amplitude of 20 to 30 mm. Hg. (27 to 40 cm. of water pressure). When pain is evoked pressures in excess of 50 mm. Hg. have been noted. The competency of the ileo-cecal valve and sphincter against regurgitation into the ileum has been well established. It is not difficult to understand how the vermiform appendix would fill readily in the presence of a high hydrostatic filtration pressure in the cecum if a functional sphincter were present on the ascending colon.

THE MYTH OF APPENDICITIS AND DIET

One need not look far into the literature of the pathogenesis of appendicitis to observe that it is believed widely that appendicitis is a disease of civilization and culture, in which diet and lack of physical activity are the chief determinants. Amongst other foods the following have been alleged to play an important role in the causation of appendicitis: increased consumption of meat and especially frozen and preserved meats, bananas, increased consumption of sugar, and the eating of inadequate amounts of cellulose. The strange thing is that bits of cellulose constitute often the central nucleus of appendicoliths which play so important a role in the genesis of acute appendicitis.

The source of the myth that appendicitis is a dietary disease would appear to have had its origin in occasional reports emanating from China relating to the rarity of appendicitis, and similar reports have since come from other parts of the world where the whites are in the minority. Anyone who will take the time to read the papers of Birt[45] (Shanghai and Middle China), Gibson[46] (Hong Kong), Russell[47] and Snell[48] (Soochow), Hedblom[49] (Shanghai), LeConte[50] (Cochin China), Phister[51] (Peiping), and the reviews of Heine[52] and Elsa Uhlendorf[53] cannot escape the impression that appendicitis is far more common in that country than we are taught to believe. Whereas the diet of the Chinese has apparently remained essentially the same for

centuries, appendicitis is being more frequently discovered as the Chinese accept the medicine of the white physician.

The same can be said for other countries. Roegholt[54] (Java), van der Gugten[55] (India), Barry and Crump[56] (Southern India), and Reyes[57] and Burdette[58] (Philippine Islands) report that appendicitis is a not uncommon surgical disorder. Burdette says that he was unable to detect the slightest anatomical difference in the appendixes of Americans, English, Japanese, Chinese, or the Malays and that no one race of people was more disposed to appendicitis than another. T. J. Dry,[59] now of the Mayo Clinic, writes me that he saw the late complications of appendicitis in the natives of East South Africa, near Cape Town, not uncommonly in his student days there. In the northern part of southern Rhodesia, where the colored population lived under less civilized conditions, Dry states that he saw no cases of acute appendicitis. That the mortality of appendicitis in Japan and South Africa is not negligible is to be noted in the summarical mortality table of appendicitis by country (table 1).

It is also not without interest that the mortality of appendicitis amongst the colored people (Negroes) in the United States is higher than amongst the whites. Table 7, on the following page, from Dublin and Lotka's[60] computation (Metropolitan Life Insurance Statistics) indicates the death rate per 100,000 was higher during each period of study for both the colored male and female group as compared with the whites for the same ages (1-74).

Something which we often fail to remember is that excision of the appendix was a rare operation in American and European hospitals before 1893. To be sure an appendical abscess was incised now and then. When Bull[61] made his report in 1873 he had only eight instances of incision of appendical abscess to report from the world's literature (nine including the first case of Mr. Hancock[62] of London, which Bull overlooked). Anyone interested in tracing the development of the frequency with which appendectomy was done in hospitals in the early years should examine Vale's[63] tables. Such an examination may in part explain why appendicitis does not appear to be so common a surgical disorder in countries where modern hospitals are relatively recent innovations. In a large number of well-known American hospitals and clinics of that day, the vermiform appendix had not been removed as late as 1893.

APPENDICITIS—A PROBLEM OF THE PUBLIC HEALTH*

In 1935 there were 16,142 deaths from appendicitis in the United States (Mortality Statistics United States Census). It ranked as the fifteenth most important cause of death including all ages. Among the policy holders of the Metropolitan Life Insurance Company between the ages of 1 and 74, a study extending over a

*It is a pleasure to acknowledge worthwhile suggestions from Dr. William P. Shepard of the Metropolitan Life Insurance Company and Dr. Gaylord Anderson, professor and head of the department of preventive medicine and public health of the University of Minnesota, in finding helpful sources on mortality figures.

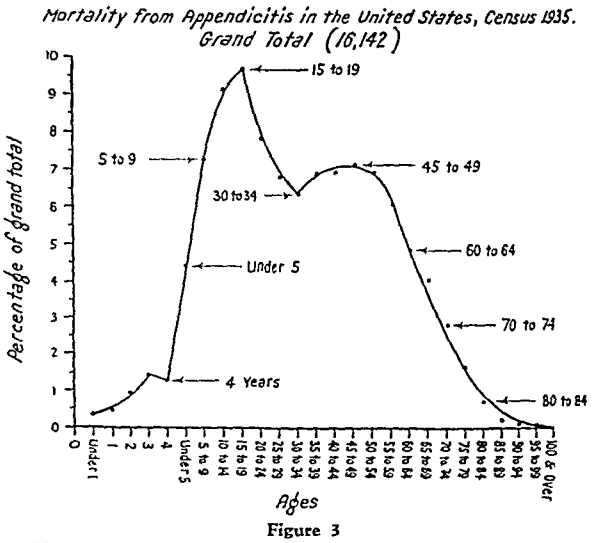


Figure 3

The plotted mortality curve of appendicitis by years in the United States in 1935. The highest mortality is between the years of 15 to 19, when 10 per cent of all deaths occur. It is to be noted, however, that at least 7 per cent of all deaths occur in each succeeding 4 year period until the middle fifties are reached.

period of a quarter of a century (1911 to 1935) showed that appendicitis was the ninth cause in the order of the number of deaths. Among gainfully employed men between the ages of 15 and 64, appendicitis ranks as the eighth cause of death. Appendicitis is accountable for more deaths annually in the United States than cancer of any one organ save the stomach. The mortality statistics for the United States indicate that when the younger age groups from 5 to 19 alone are considered, appendicitis is found to be uniformly throughout these years one of the agents of death which exacts a high toll. The accompanying table 8 from a Massachusetts compilation discloses that appendicitis is the second to fifth most important cause of death during these years, a finding with which the mortality figures for the country at large are in general agreement.

Whereas the greatest frequency of the disease occurs during these years, it is startling to observe that the mortality of appendicitis continues at about the same level over a number of years. This means that despite its lessened frequency of occurrence the percentile mortality of the disease for those years has actually increased materially.

Among all causes of death at all ages appendicitis ranks next to syphilis, including all forms of that disease. Whereas the economic burden of the death toll in appendicitis does not weigh so heavily upon society, in that its victim does not become a public charge as is usually the case with general paresis, yet appendicitis commands undoubtedly a toll of more useful lives. This loss of useful lives from appendicitis is the more to be regretted since deaths from appendicitis are avoidable if operation is undertaken early. The mortality is essentially one of procrastination. And whereas the lay public may feel that improvements in surgery may readily make adequate amends for this loss of opportunity, we know very well that our accomplishment in the management

of peritonitis is little better than it was at the dawn of the era of abdominal surgery. Whereas more lives of neglected cases may be salvaged by conservative management, the only way to stop this wanton sacrifice of lives is to have patients with acute appendicitis come to operation early.

The entire medical profession must be alive to the potential danger of this sword of Damocles which hangs over everybody's head who retains his vermiform appendix. A public health program of instruction must be undertaken to acquaint communities at large with the hazards of appendical obstruction. Mothers must be enjoined not to give cathartics in the presence of abdominal pain. Patients must be instructed not to medicate themselves or consult their pharmacists but their physicians for abdominal pain, and shortly after its onset. School nurses as well as physicians must learn that the absence of fever does not militate against appendicitis when abdominal pain is present. And finally the alleged health restorative power of cathartics must not be broadcast over the radio or proclaimed by the pharmacist over the counter.

It is decidedly discouraging to contemplate, however, that the mortality of appendicitis is higher by occupation among physicians and surgeons than it is in the population at large. In the group of gainfully employed men between the ages of 15 and 64, Jessamine Whitney[64] found by a study of the mortality of ten states from the mortality statistics of the United States Census that the death rate for the group as a whole was 20.7 per 100,000. For physicians and surgeons the rate was 22.1. Nowhere is the proverb of "physician heal thyself" more applicable!

THE FREQUENCY OF APPENDICITIS

The studies of Aschoff[65] upon necropsy material indicate that of persons dying in the sixth and seventh decades of life, 75 to 80 per cent exhibit evidence of previous disease in the appendix. Very few persons who live the Biblical three score and ten reach the grave with a normal appendix.

Kraft[66] of Denmark finds that about 2 per cent of Denmark's 3,500,000 people surrender their appendix to the surgeon yearly. In the Friedrichsberg Hospital, which serves a community of 100,000 people, where he works the incidence of appendectomy is the same.* Kraft believes that about 10 per cent of people during their life time have at least one acute attack of appendicitis. Of those who recover spontaneously from an attack, the recurrence rate of attacks he estimates at 30 per cent. It is interesting that in his group of cases appendicitis was as frequent in the female as in the male. R. E. Buirge,[67] my associate, has been making an inquiry relating to the number of persons who have had their appendix excised. In a group of more than 27,000 persons comprised of school children, nurses, men in C.C.C. camps, and patients admitted to the University of Minnesota Hospitals, he found that 8.6 per cent admitted having had appendectomy. The lowest incidence was among school children 2.5 per cent and the highest among a group of 150 nurses 28.7 per cent of which number had submitted to appendectomy. In a statistical study of appendectomy in the Civilian Conservation Corps, Rudder[68] found the incidence of appendicitis in a group of 200,000 young men between the ages of 18 and 25 to be 3 per 1,000 per annum. Wevill and Wallace[69] estimated on the basis of the population of Scotland and an analysis of 8,000 cases of acute appendicitis treated at the Royal Infirmary at Edinburgh over a 10 year period that the maximal incidence of the disease for the male was 12 years and for the female about 18 years. One in 200 (500 per 100,000) boys of 12 years were appendectomized annually for acute appendicitis and one girl out of every 230 at the age of 18 years. Gundel and Mayer[70] have discussed interesting aspects of the appendicitis problem in Germany.

Alleged seasonal occurrence of appendicitis.—A seasonal incidence of appendicitis has been claimed by a large number of writers, particularly those who insist on a causal relationship between infection of the upper respiratory tract and appendicitis. That infection may cause swelling of the lymphoid tissue which in turn may obstruct the lumen of the appendix has been admitted already. Bowers[31] was unable to detect any suggestion of seasonal prevalence of appendicitis in his group of cases. In a group of 8,000 cases of acute appendicitis reported by Wevill and Wallace[69] from Edinburg, the occurrence of seasonal occurrence is denied. A study of the mortality of appendicitis in this country from month to month lends no support to the belief that appendicitis is a seasonal disease.[71]

Rostowzew[72] was unable to establish any correlation whatsoever between the occurrence of appendicitis and influenza in St. Petersburg. His graph indicates little variation in the frequency of appendicitis and considerable fluctuation with reference to influenza. Renn[73] came to the same conclusion with reference to tonsillitis and appendicitis.

NECESSITY FOR REVISION OF THE CLINICIAN'S CONCEPT OF APPENDICITIS

Whereas there may be other causes of appendicitis than occlusion of the lumen, the only one definite tangible agency which will bring about the sequence of events which terminates in diffuse leukocytic invasion of the walls of the appendix, gangrene, or perforation is obstruction. Inasmuch as all the histological varieties of the disease recognized by the pathologist can be reproduced by occlusion of the lumen in man or in animals (chimpanzee and rabbit) in which the appendix secretes fluid actively, it is reasonable for the clinician to consider appendicitis as the sequel of luminal obstruction.

With such a consideration in mind it is necessary to resurvey the symptoms and physical findings which are regarded generally as being typical of the disease. The dicta of Murphy, namely pain, nausea and vomiting, abdominal sensitiveness, fever, and leukocytosis, have been accepted almost universally as clinical desiderata of the disease. The teachings of the late Sir David Wilkie[74] with reference to "appendicular obstruction" should prop-

*Barnes estimates that somewhat more than a million and a half appendectomies are done yearly in the United States (1.18 per cent of the total population). He believes that half again as many more should have had appendectomy. Texas State J. Med. 34:360, 1938.

erly be applied to all cases suspected of being appendicitis in the light of the significance of luminal obstruction in bringing about various end effects of the disease. One can no more foretell the secretory capacity of an obstructed appendix than he can the progress of the disease by interpreting the physical findings.

In so far as appendicitis is not an infection primarily, the inflammatory features of the disease are absent altogether usually in the beginning. Therefore the pulse, temperature, and leukocyte count may all have fairly normal values for some time after the onset of the disease.

Appendicitis is essentially a closed-loop obstruction in which a very short segment is concerned, with no interference with continuity of the main intestinal channel. The only early findings in a closed-loop obstruction are intermittent crampy pain and local tenderness. Vomiting may be absent altogether. Elevation of the temperature, hurrying of the pulse, and leukocytosis are evidence that the infective characters of the disease have been set in motion.

It is equally as necessary that the physician reorient himself in the subjective and objective findings of the disease as it is that the pathologist revise his concept of appendicitis. The potential hazard of all closed-loop obstructions needs no amplification.

NEED OF REVISION OF INDICATIONS FOR EXCISION OF THE VERMIFORM APPENDIX

In the light of the nature of the origin of appendicitis, it is apparent that sacrifice of the appendix should be made on lesser indications. If all persons who exhibit evidence of previous appendical disease in the upper brackets of life (75 to 80 per cent according to Aschoff[65]) actually were threatened at some time during their life by an acute attack, there might appear good reason to establish a new surgical covenant and, unlike circumcision contracted with Abraham, one binding on both sexes. There appears to be no good evidence now available, however, which indicates that all persons whose appendixes reveal traces of disease have actually suffered from appendicitis. The surgeon sees over himself the threatening shadow of the pathologist who is accustomed to think in terms of disturbances of morphology rather than function. In consequence the surgeon has become hesitant in excising the appendix on lesser indications, though he knows very well that no constant correlation exists between a clinical appraisal of the severity of an attack and progress of the process in the appendical wall. Reports like those of Charles W. Mayo[75] and Rea and Kleinsasser[76] are reassuring. In patients not admitting acute attacks but complaining of right lower quadrant pain, in whom examination excluded other palpable causes, appendectomy was followed by relief of pain in 70 per cent of Mayo's cases and in 78 per cent of Rea and Kleinsasser's cases. Sources for abuse and disappointment in promiscuous appendectomy are obvious. The very occurrence of the occasional "adhesion-former," who is started on a life of chronic invalidism by excision of a fairly innocent appendix, constitutes alone a serious deterrent to operation without good indication. Nevertheless physicians and surgeons must be less restrained in their indications for operation in the patient whose symptoms suggest acute appendicitis. Marsch[77] and Aschoff[78] on analyzing independent data suggest that the mortality of the medical management of acute appendicitis is somewhere between 6 and 7 per cent. Surgeons with alert and knowing consciences are not likely to advise operation without just cause.

Those who affect to believe in the inheritance of acquired characters may be at pains to tell us that the removal of the appendix through a few generations of people might succeed in the anatomic elimination of this useless member. Let me remind you, however, that the covenant of circumcision kept faithfully since the time of Abraham save for the dereliction of Moses in the wilderness, but renewed promptly by Joshua, has failed to produce a race of male infants without a prepuce. And Matthew enumerates 42 generations alone between Abraham and Christ! Unfortunately, therefore, there appears to be no safe method of promise other than surgical intervention to eradicate the dangers of an obstructed vermiform appendix.

SUMMARY

The vermiform appendix of man is a narrow diverticulum of the intestinal canal; its luminal capacity at a pressure great enough to overcome the resistance to inflow (60 cm. water) is about 0.5 cc.; its orifice is covered in whole or in part by a mucosal fold which contains no muscle fibers, in about 80 per cent of instances. There is little evidence of an anatomic sphincter muscle at the site of appendico-cecal union. In infants, a funnel shaped type (Treves' type I) of union exists between vermiform appendix and cecum. In children more than one year of age and in adults, Treves' type III is the most frequent variety. The lymphoid tissue and glandular epithelium parallel one another closely in growth and exhibit the greatest development between the eleventh and twentieth years. These anatomic features of the appendix are such as to favor retention of material which once enters it.

Proof is offered herein to indicate that the vermiform appendix of man and the chimpanzee, as well as the vermiform cecal appendage of the rabbit, secrete fluid.

Evidence is offered to indicate that the vermiform appendage of the rabbit will perforate quite regularly after 10 to 14 hours of obstruction, and frequently considerably sooner. Rupture was observed in the vermiform appendix of one chimpanzee 33 hours after obstruction and occurred in another after 39 hours. Obstruction of the exteriorized vermiform appendix of man is attended usually but not regularly by the development of a high intraluminal pressure.

The highest record of sustained pressures attending incannulation of the obstructed appendix has been for man 126 cm. of water pressure, rabbit 136 cm., and chimpanzee 106 cm. In two gibbons the highest pressure reached was 18 and in another 19 cm. of water; in neither instance was the pressure sustained for any length of time. The cecal appendage of a large variety of animals was found to exhibit no evidence of secretory capacity.

That the fluid collected is a true secretion and not a filtrate is indicated by the height of the pressure approximating the systolic blood pressure, the intraluminal pressure being greater than the tissue pressure in the appendical wall. In the rabbit about 20 cm. of fluid may be collected during the first six hours of obstruction, the rate of secretion tapering off gradually. The obstructed vermiform appendixes of man which exhibit secretory pressure secrete usually from 1 to 3 cc. of fluid a day. The true nature of this fluid demands explanation still as does the morphology of the cell or cells in which it has its origin.

All the varieties of appendicitis recognized by the pathologist may be produced by luminal obstruction in animals whose vermiform appendage possesses the capacity to secrete fluid. Animals whose cecal appendages exert no secretory pressure fail to exhibit histological evidence of tissue damage attending obstruction. Similarly in animals (rabbit) in which secretory pressure is manifest, if the pressure is maintained at a low level by removal of increments of secreted fluid no histologic evidence of injury may be observed. In the obstructed exteriorized vermiform appendix of man the histologic picture of diffuse suppurative appendicitis has been produced, but obstruction has been released before gangrene or perforation occurred.

Whereas there may be other causes of appendicitis than obstruction, the only tangible cause is obstruction and it would appear that this cause alone will suffice to account for all the varieties observed clinically.

Fecaliths and swelling of lymphoid tissue are probably the most frequent causes of appendical obstruction in man. Kinks, bands, position (retrocecal), and stenoses may also cause obstruction. Occasionally, even in excised appendixes exhibiting good evidence for an obstructive origin, no obstructive agent can be demonstrated. The possibility of prior extrusion or solution of an obstructing fecalith in such instances is at least a possibility to be considered. How the appendix fills and how appendicoliths form still remain to be elucidated.

The matter of "geography, diet, and culture" as related to the origins of appendicitis is a myth. Appendicitis is not infrequent in natives of China. Chimpanzees transported from Africa develop the histologic picture of appendicitis under conditions of luminal obstruction. The native Negro of East South Africa develops appendicitis there, and in this country the mortality from appendicitis in the Negro is higher per unit of population than in the whites.

Appendicitis is a problem of the public health. Throughout the years from the age of 5 to 19, the disease ranks as the second to the fifth most frequent cause of death. In the ensuing years, whereas its toll of life remains largely the same for several decades because other more frequent causes of death appear, appendicitis wanes in significance. In the gainfully employed between the ages of 15 and 64 in this country, appendicitis ranks as the eighth most common cause of death.

McBurney said in 1889: "What we wish to accomplish in the treatment of appendicitis is, not to save half of our cases, nor four cases out of five, but all of them." The years have taught us to be less sanguine, but we must through processes of professional and public education learn how to better our present cheerless accomplishment.

The pathologist must revise his concept of the origins of appendicitis. A revision of the clinician's concept of the symptoms and physical signs of the disease is equally necessary. The indications for the removal of the appendix must be liberalized, for this humble but treacherous worm is truly the "Uriah Heep" of the abdomen.

CONCLUSIONS

These studies on the functional behavior of the vermiform appendix in man and anthropoid apes and upon the vermiform cecal appendix of the rabbit and the cecal appendages of a large variety of animals, justify the conclusion that appendicitis may occur through the agency of luminal obstruction in all appendixes which exhibit a secretory capacity. It is believed that obstruction is the probable sole exciting cause of spontaneous appendicitis in man.

Appendicitis destroys enough lives in this country to warrant stamping it a problem of the public health. Every effort should be bent to enlist the cooperation of the public, departments of public health, physicians, and surgeons in stopping this avoidable wanton sacrifice of lives.

It is hoped that a better understanding of the functional behavior of the vermiform appendix will help to clarify the chaotic status of our knowledge with reference to the origins of appendicitis and bring patients with appendical colic earlier to operation.

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Report of American Student Health Association Committee on the Hygiene of Physical Education Activities*

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I. *Orientation.*

A. The hygiene of physical education activities is largely the practice of individual hygiene by means of such activities. Physical education activities that lead to the formation and practice of habits that produce, improve, maintain, and defend the somatic, mental, and social health of the individual participant are practices of individual hygiene. They are also practices of group hygiene, provided usually by the home group, the school group, and the neighborhood group. They have become increasingly practices of societal hygiene (community hygiene) particularly in this country under the influence of such organizations as the Playground and Recreation Association of America, now known as the National Recreation Association.

B. Physical education activities are first and, in part always, autonomic. They become voluntaristic with the beginning of the post-natal life of the individual. Muscle tone is developed early in prenatal life and this state of basal autonomic activity is maintained to a greater or lesser degree by the voluntary muscles of the individual as long as he lives. More obvious prenatal autonomic motor activities may be noted in the kicking, thrusting, turning, and other exercises of the voluntary muscles of the unborn child. Autonomic motor activities may be noted also by listening to the heart beats of the fetus.

C. Voluntaristic physical education activities are necessarily postnatal activities. They are motor and locomotor exercises of the skeletal muscles and of all the organ systems associated with those muscles and upon which the skeletal muscles depend for the maintenance of life and for the performance and perfection of functions essential to their health. These voluntaristic exercises of body, mind, and personality educate the postnatal individual physically, mentally, and socially, during his infancy, childhood, youth, and even his maturity. Such education may be wholesome and desirable or vicious and undesirable.

D. There is an essential *holism* of physical education activities. They *must* be activities of the *whole* individual. Mrs. Walter H. Brown, known affectionately to all Public Health people in the United States and most everywhere else as "Mother Brown," urged years ago in connection with child health programs that education is concerned with "the *whole child*." We are learning much about the whole child in educational circles today. That insistence applies without any reservation to the physical education of the individual in every age period. These activities *must* be—they cannot escape being —physiological, psychological, and social activities. They are motor and locomotor behaviors of the human postnatal individual who as a multicellular biological organism is and at all times must be a somatic, psychological, and socially integrated being. The integrations may be poor, or fair, or good, but all are essential to the wholeness of the life and therefore the health of the individual.

E. Thus physical activities are autonomic and voluntaristic exercises of actual and potential soma, mind, and personality that educate the individual physically, mentally, and socially. And may I repeat, this education may be wholesome or vicious. It may contribute to health or it may damage or defeat the health possibilities present in the biological heritage of the individual.

F. Prepared leadership in physical education activities is of the utmost importance in relation to the formation and practice of favorable somatic, mental, and social health habits by the participant. Infancy, childhood, youth, and maturity need this prepared leadership. The mother and father, the play leader, the teacher, the physical education teacher, the physical director, the athletic director, the coach, the physician, and every other dominant leader of participants in physical education activities, whether those activities be the squirming, kicking and thrustings of the infant; the play of little children; the games of children; the sports and athletics of youth; or the physical recreations of maturity should be prepared with a competent knowledge of the fundamentals of human biology and its essential involvements of anatomy, physiology, psychology, and social psychology.

G. And those leaders in physical education activities are the most effective in their influence upon the formation and practice of favorable health habits who combine an adequate preparation in human biology with a personality that stimulates loyalty, respect, and confidence in those whom they are leading.

H. Competent professional individual health service is an essential to the favorable hygiene of physical education activities. The common occurrence of vulnerabilities that are health hazards to the individual participant forces the acceptance of the conclusion that competent health examination, advice and treatment are an essential part of the hygiene of physical education activities. In support of this contention you need only remind yourself that childhood and youth belong to the period of greatest incidence of tuberculosis; that these are age periods in which rheumatic heart disease appears; and that there are a number of other health conditions of the individual that along with these indicate a modification of physical education activities fitting those activities to the needs of the individual. Competent health examination, advice and treatment can be secured only from the adequately prepared physician.

I. Medical education and medical experience will ultimately furnish in large number scientifically competent men and women who will not only be able to uncover somatic vulnerabilities such as those noted above but will also be able with increasing keenness to discover the mental health hazards and personality health hazards of the individual that call for his special protective and educational guidance in order that the physical education activities of the individual having such limitations may be so modified that they shall contribute to the improvement and defense of his mental and social health.

J. Insistence must also be made on the inclusion of a competent service for the prevention and care of traumatic injuries as an essential part of the hygiene of physical education activities. Investigations that have been made in recent years furnish ample evidence of the importance of these agents that injure health in terms of athletic injuries in our secondary schools and in our colleges and universities.[1]

K. Furthermore, the hygiene of physical education activities involves—it must involve—the hygiene of physical, biological, and societal environment of those activities. Physical education activities cannot be favorable to health in an environment that is physically or biologically or societally adverse to the somatic health or the mental health or the social health of the individual participant.

L. Informational Hygiene is an inescapable part of physical education activities. Every leader of physical education activities, whether that leader be a parent, a teacher, the head of a neighborhood group, a physical director, a coach, or some other leader, is inevitably expected by each individual member of his group to furnish information for the solution of his somatic, mental, and social health problems. No leader of physical education activities in any age period is fit for his or her leadership in the absence of a fundamental preparation for the job. Too often such a leader is a source of misinformation and sometimes of vicious information.

*Presented at the American Student Health Association meeting, New York City, December 30, 1938.

†Chairman. Drs. Chenoweth, Howe, Kler and York.

II. *The Somatic Hygiene of Physical Education Activities.*

The practices of physical education activities. The formation and practice of health habits through participation in physical education activities, that produce, improve, maintain, and defend somatic health.

A. Let us remember first, that physical education activities are exercises of the somatic functions of the individual. *They are autonomic and voluntaristic and passive, mild, or vigorous* exercises of (1) the voluntary muscles, (2) the brain, spinal cord, peripheral nervous system, and the autonomic nervous system;[2] (3) the endocrine glands and other glands; (4) the heart and blood vessels; (5) the organs of respiration; (6) the heat regulatory organs; (7) the excretory organs; (8) the organs concerned with the supply of fuel foods, other foods, food accessories, water, inorganic salts and oxygen, all of which are, and every one of which is, essential to physical education activities and all of which are, and every one of which is, necessary for the maintenance of the life and therefore of the health of the individual.

B. Let us remember further that favorable physical education activities stimulate metabolism—they *must* stimulate metabolism. They must stimulate nutrition, growth[3] and development within the limits of the biological heritage of the individual.

C. We should also remember the effects of deficiency or deprivation of physical exercise. You need only to recall the children you have known who have suffered the effects of infantile paralysis. Or perhaps you yourself have had a fractured arm or leg and have spent several weeks under the immobilizing influence of a splint. Do you remember what happened to the unused muscles in infantile paralysis or in consequence of immobilization? This point need not be labored.

D. The facts which have been placed before you justify the expectation that you will agree that the somatic hygiene of physical education activities involves not only a consideration of the exercise of skeletal muscles but also of a number of other somatic involvements, such as respiration, nutrition, water supply, vitamin and inorganic salt requirements, excretion, and rest.

III. *The Mental Hygiene of Physical Education Activities.*

The formation and practice of habits favorable to the mental health of the participant in physical education activities. The activities of physical education that produce, improve, maintain, and defend the mental health of the individual.

A. Biological research has proved that all protoplasmic cells of whatever sort possess certain fundamental properties in common. Every human life begins as a single protoplasmic cell, a living fertilized ovum about one one-hundredth of an inch in diameter, formed by the union of two living germ cells. In common with all protoplasmic cells, the single-celled human being possesses sensitivity. Every cell of the multicellular human organism produced by successive mitoses of that first cell is sensitive to stimuli from its internal and its external environments. Every such cell responds to the stimuli that disturb its sensitivity with some sort of resultant organic activity. This *reflex action* is a common property of *all* protoplasmic cells.

B. Biology teaches also that stimulations repeated in sequence at intervals of sufficiently short duration produce reflex cell responses that vary in quantity and quality. The variations produced by such repetitions must be due to continuations of the influence of preceding stimulations. This persistence of the effects of the stimulations of cell sensitivity is of the nature of memory. We have here evidence of protoplasmic memory, or cell memory, described by biologists as organic memory.[4] These phenomena exhibited by associations of cells such as those formed by the cells of the nervous system and those of the organs of the voluntary muscle systems, constitute associative memory.

C. Physical education activities exercise the protoplasmic cells of the voluntary muscles and those of the neurone chains that are associated with them as well as of the numerous other associations of cells implicated in physical education activities. These activities lead to the establishment of organic memories and associative memories that govern *such skills and techniques of* physical education activities as those of the child that has "learned" to use its eyes, its tongue, its arms and legs, its fingers, and that has learned to walk and to run. They are probably fundamental to the skills and techniques of the specialized participant in physical education activities, of whom the athlete is perhaps the most spectacular example.

D. Cell sensitivity, cell reflexes, cell memory, and associative cell memory, are probably fundamentals of mind. In any event they are essential parts of all physical education activities.

E. Mind is interpreted in this report as government of behavior. In accord with this interpretation, there are several levels of mind. These levels are actually or potentially present in the living organization of the single protoplasmic cell that, for an hour perhaps, is all there is of a human being at the beginning of his or her life. These levels of government—that is to say, of mind—may be described as (1) physical-chemical, (2) tropic, (3) hormone, (4) nerve reflex, (5) instinct government, and (6) government by intelligent mind. Physical education activities exercise *all these levels of mind.* They exercise all of them automatically and some of the voluntaristically. There is reason to believe that they exercise an educative influence on all these levels of government. There can be no question that under favorable leadership physical education activities exercise, and therefore educate, the qualities of intelligent insight mind, reflective mind and creative mind. These are exercises that when favorable produce, improve, maintain, and defend the mental health of the participant.

F. Thus physical education activities, particularly in the periods of childhood and youth, may lead the individual to form and practice habits of mental hygiene that are characterized by such qualities as self-control, self-respect, satisfaction without regret, joyousness, happiness, and wholesome enthusiasm.

IV. *The Social Hygiene*[1] *of Physical Education Activities.*

The formation and practice of social health habits by the individual through participation in physical education activities. The education of—the production, improvement, maintenance, and defense of—wholesome social personality through favorable participation in societal physical education activities.

A. The life of each one of us begins with a somatic heritage, a mental heritage, and a heritage of multiple personalities present actually and potentially in the single cell that for a time—an hour perhaps—is all there is of any one of us. Under the influence of favorable environment and of favorable behaviors in relation to environment we grow, develop, mature and become multicellular somatic, mental, and social individuals, educated for good or for evil by the sorts of interactions that characterize our behaviors in relation to our physical, biological, and societal environments. As we understand it, as a product of these behaviors, personality is the somatic, mental, and social evidence with which one describes and identifies himself to others.

B. Physical education activities are exercises of multiple personalities. Under favorable leadership and guidance selective habits are formed by the individual that build for him wholesome social personality, that is characterized by fair play, sportsmanlike behavior, unselfishness, respect for the golden rule, good taste, cooperation, altruism, and similar qualities of healthful social personality.

C. Under the wrong sort of leadership vicious personalities are emphasized and educated by participation in physical education activities, made unfavorable by such leadership. The re-

[1]See, for example, Bulletin No. 23, the Carnegie Foundation for the Advancement of Teaching, "American College Athletics," Ch. VII, "The Hygiene of Athletic Training," p. 135.

[2]The assumption is that the autonomic nervous system includes the sympathetic nervous system. Perhaps the sympathetic nervous system should have been listed separately.

[3]For a convincing illustration of influence on growth, see "How Animals Develop," by C. H. Waddington, W. W. Norton and Company, 1936, p. 112, fig. 28, "Differences in guts of tadpoles fed (a) mainly on vegetables, (b) exclusively on meat (from Durken)."

[4]See "Heredity and Environment in the Development of Men," by Edwin Grant Conklin, Princeton University Press, 1930. Pp. 36 et seq. "Germinal Bases of Mind."

[1]The term "social hygiene" as used here does not refer specially to nor is it limited to *sex social hygiene*, the venereal diseases, prostitution, etc.

sultant personality product may be a-social or anti-social. Selfishness, greed, cruelty, hatred, are synonymous with "dirty play," unnecessary roughness, dishonorable or dishonest conduct.

D. There can be no intelligent argument against the contention that favorable physical education activities under prepared competent leadership, particularly during the period of childhood and youth, exercise selectively and therefore educate selectively emergent wholesome social qualities of personality.

V. *"The Law of Exercise."*

And now may we call your attention to the evidence we have set before you that supports a conception that was current some forty years and more ago. This conception was that there is a biological law of use, a law of exercise. This law is to the effect that favorable biological exercise stimulates an increase in the blood supply and therefore the nutrition of the organs and organ systems involved; promotes their growth, development and maturation within the limits of their biological heritage; perfects their functional competence; and, again within the limits of biological heritage, educates the body, mind, and personality of the human participant.

In further support of the validity of this "law", we need only remind you of what you already know through your own personal observation concerning the effect of deficiencies or deprivations of exercise and concerning the effects of the wrong sorts, qualities and quantities of educative exercise whether such exercise be mainly physiological or mainly psychological or mainly social.

VI. *Summary.*

In conclusion, we urge in review of our report, first that every human being is a biological entity constituted by a heritage of an inseparability of body, mind and personality, utterly dependent upon the favor of environment and upon favorable somatic, psychological and social behaviors in relation to environment; second that physical education activities exercise—*must exercise*—the whole individual, physiologically, psychologically and socially; and third that, under favorable prepared leadership, the individual participant in physical education activities, particularly in the periods of childhood and youth, will form and practice health habits that produce, improve, maintain and defend the somatic, mental, and social qualities of his life.

Report of American Student Health Association Committee on Informational Hygiene*

Prof. T. Bruce Kirkpatrick†
New York City

If the achievement of your Committee on Informational Hygiene seems meager for the time which has elapsed since the last meeting of our association, this very modest beginning may be attributed in part to some early uncertainty concerning the committee's membership. By the time the personnel of the committee had been definitely agreed upon and the objectives of the committee defined, May had come, and the approaching end of the college year made it impossible to accomplish anything before the opening of the colleges in September.

Since your committee seeks further guidance and constructive suggestions concerning the specific services it may render, it may add to the pertinence—even the relevancy—of the suggestions received, if we state the general objectives which the committee have in mind.

In his letter concerning the work of this committee, Dr. Shepard expresses the belief that owing to the Second Conference on College Hygiene, the members of this association have shown a marked increase of interest in the area of informational hygiene. He expresses the hope that this interest may be maintained and that the many problems of college hygiene be systematically studied. I quote from his letter:

"It is our hope that this group (the Committee on Informational Hygiene) can set up a constructive plan of attack on these problems in the nature of a long-time plan. You may wish to work on this plan over a period of several years, as we are doing in our tuberculosis committee, giving the association a progress report each year and using the annual meeting as a means of discussing this progress and authorizing procedures to be carried out during the succeeding year."

Among the problems suggested for this long-time planning program were the following:

1. A detailed outline of subject matter, material, methods and activities for informational hygiene courses appropriate for use in teaching:
   a. General college students.
   b. Junior college students.
   c. Seminary students.
   d. Teachers' college students.
   e. Students in education who are planning to teach hygiene at the elementary and secondary school levels.
2. The construction of a selected reference manual in the field of informational hygiene with a list of references which are scientifically sound. These might be arranged by subject. Some plan should be devised for adding new references to this list from year to year and for making these manuals available to our members. Your committee might serve in a consulting capacity to advise those who seek information. This manual should include particularly all visual aids which are available for hygiene teaching.

In developing his theme Dr. Shepard stresses the hope that this committee will be able to render significant service to the teachers of hygiene in the smaller colleges, many of which are not members of our association. He suggests that when the committee gets under way it may be found expedient to have committee representatives in each of our sectional organizations.

In the light of this statement of your committee's objectives, some may have misgivings as to whether or not we have "what it takes," but certainly no one can assert that our President is lacking in vision. If this committee is ever accused of overambition we can "point with pride" to the source of our inspiration.

In accordance with the suggestions outlined above, the Committee on Informational Hygiene was divided into three subcommittees and, since it did not seem advisable to attempt a consideration of our whole program at the outset, each of these sub-groups was asked to study, and to report on a single subdivision of the foregoing recommendations. In order to save the time that would have been consumed in getting a consensus of the committee's opinions as to what should be our immediate objectives, the chairman took the liberty of assigning the problems on which the three sub-committees were asked to submit suggestions for our initial report.

One group consisting of Dr. DeKruif, Dr. Scott and Dr. Turner, with Dr. Turner serving as chairman, was asked to give some preliminary consideration to the question of *materials*

*Presented at the American Student Health Association meeting, New York City, December 29, 1938.
†Chairman.

for hygiene instruction and to submit recommendations concerning the kinds of service our committee might be able to provide in that area.

Dr. Wood and Dr. Forsythe, with Dr. Wood as chairman, were asked to give their attention to the *problem* of *methods* of *teaching hygiene* and to recommend procedures for fact-finding and for conveying to those wishing it the kind of help they are seeking.

Dr. Gould, acting alone, was asked to study the question of visual aids and to suggest procedures for discovering or providing such aids and for making them, and information concerning them, available to the members of our association and to others who are interested.

All the members of our committee expressed a keen interest in the subjects they were asked to consider and seemed eager to attack their respective problems. As I have already stated, the time available was not sufficient for fact-finding concerning the present status of content and methods in informational hygiene; nor was it possible to prepare recommendations in detail concerning the organization best adapted to the kinds of service the committee hopes to render. However, it is hoped that the brief, tentative and rather general recommendations that follow will be sufficient to provoke discussion leading to the authorization by this Association of specific undertakings for the coming year.

. . . . .

Reporting for the sub-committee on Materials of Hygiene, Dr. Turner writes:

"It is proposed that the Committee on Informational Hygiene should produce an annotated bibliography covering reference books useful to teachers of college hygiene. The first step in securing such a bibliography would be to query teachers of hygiene as to the books which they would recommend as most helpful. It is felt that in phrasing the letter, the Committee might well request teachers to indicate the particular values which they have found in various books. It is proposed that on the basis of these comments and further references to the specific books, the Committee should prepare its annotations for the list. We recommend that this be prepared for distribution at the time of the meeting in December, 1939.

"We recommend there be included with this bibliography a statement of the types and sponsorship of newspaper columns.

"We recommend that there be included with this bibliography a list of professional magazines together with a statement touching their perspectives and specific values. We recommend also the inclusion of a commentary with regard to the nature and uses of health materials in current publications outside the standard professional magazines.

"We recommend that the Committee on Informational Hygiene consider among its future activities the possibility of preparing suggestions with respect to the teaching of specific units of instruction. These suggestions would be brought together from the Committee and from our membership and would include possible student activities, classroom demonstrations, visual materials, and references to source materials. Units to be given consideration might include such diverse activities as community surveys by students on the one hand and units of direct classroom instruction on the other."

. . . . .

Dr. Wood in reporting for the sub-committee on methods includes some brief comments on a variety of methods which she has studied or observed, and upon one which she has tried. I take it that she does not wish these comments to be interpreted as recommendations but rather as suggestions thrown out to provoke discussion. Some of these suggestions and comments are thought provoking.

From a letter following these comments couched in more general terms I quote the recommendations of Dr. Wood's committee:

"It would seem to be the judgment of our committee that a study of the most effective methods of teaching hygiene should be made in order that the teaching of hygiene may eventually be placed upon a comparative scientific basis of teaching as is reading, mathematics, etc. Such advance can be made by the teachers of hygiene who become research-minded in their point of view toward evaluation of improved methods and techniques in teaching hygiene.

"It would seem then, that the function of this committee is (1) to find out what is being done and follow lines of special investigation now being made and, (2) to foster or stimulate a further study along this line in schools where such studies are not being made.

"Closer coöperation with the departments of education in the various colleges and universities may show techniques or methods now being applied in other fields which if applied to the teaching of hygiene might help to place the teaching of this subject on a more scientific basis. It is possible that new and unexpected contributions may result from new departures in method. Progress regarding such studies should be possible to be followed by a continuation report, something on the order of the reports sent in to the North Central Association of Colleges, which give opportunity for the college to show evidence of its growth and development. Hygiene departments should be encouraged by this committee to experiment with new methods and evaluate their results toward making advance in this science of teaching hygiene.

"A study of how student interest may be utilized will depend upon knowledge of the various methods which are being found most effective.

"It would seem as yet impossible to say to what extent it is desirable to be guided by student interest until it has been determined how comprehensive student interest really is. This must await further studies.

"The time has been too brief this fall to prepare adequate questionnaires which would secure data from the colleges concerning present methods of teaching. This is being planned for the coming year. The data concerning present methods which are found especially effective could be reviewed and mimeographed if expense would permit, or reviewed and published in the JOURNAL-LANCET, if space would permit."

. . . . .

Dr. Gould, reporting for his committee of one on Visual Aids, Visual Teaching Aids, included the following:

1. The presentation of graphs, lecture outlines, charts and statistical data in chalk upon the blackboards.
2. The presentation of hygiene material in the form of charts or posters in colors.
3. The use of lantern slides to present data, graphs, charts or illustrations.
4. The use of silent or sound movie films pertaining to subjects within the field of hygiene.
5. The use of scientific demonstrations, including preparations mounted under the microscope, gross bacteriological and pathological specimens, papier mache and plaster models particularly of anatomical parts, and experiments (with equipment from the physiology laboratory) which are not too technical yet serve to sell important points.

It is recommended by the undersigned that this sub-committee stress the necessity of securing, from our national organizations pertaining to the prevention of disease and the improvement of health, a greater number and better quality of sound movie films pertaining to hygiene subjects, even if financial subsidization becomes necessary. We need more films of the quality of *Behind the Shadows*, provided by the National Tuberculosis Association.

SUMMARY AND CONCLUSIONS

I have stated rather fully the general objectives of our committee, namely, to study the materials (including visual aids) and the methods of hygiene instruction at the college level and to collect, formulate and recommend such materials, devices, activities and procedures as may be helpful to the members of our association and to others desiring guidance toward improvement of the quality of hygiene instruction in their respective institutions. This general statement should provide a basis for discussion leading to the adoption of recommendations for the future guidance of your committee. It should also help to guide the discussion and to promote relevancy.

The reports of our three sub-committees have been given almost in full, but not as final recommendations. The content

of these reports should be regarded rather as tentative reflections advanced to stimulate discussion along lines that will be suggestive of the future activities of your committee.

Report of Round Table and Supplementary Committee Report

Since there was insufficient time at the general session on Friday afternoon, December 30th, for a report on the Round Table conducted by the Committee on Informational Hygiene, it was suggested that this report be included in the Proceedings. Pursuant to this suggestion your committe submits the following:

It seemed to be the opinion of those attending the Round Table, and it is the judgment of your committee that our task for the current year should be the continued pursuit of the objectives outlined in the Committee's report. In outline, then, the program of our three sub-committees will be as follows:

I. *The Sub-Committee on Materials* will collect and prepare material for a booklet or pamphlet containing:
   - A. An Annotated Bibliography.
   - B. Abstracts of pertinent articles and papers, both lay and professional.
   - C. Suggestions concerning the special values of books and articles.
   - D. A listing of materials for certain units of instruction demanding special emphasis, *e. g.*, Cancer, Venereal Disease, Tuberculosis.
   - E. Visual Teaching Aids.

As a means of making these materials available to the membership of our association, it was decided to include the literature and the visual aids in a single publication, and your Committee was authorized by the Association to seek the coöperation of the Metropolitan Life Insurance Association in preparing and publishing the booklet.

Pending the publication of this material your committee wishes to call the attention of the members of our association to the following present sources of bibliographic material:

1. Special bibliography prepared by the National Tuberculosis Association and the *Library Index*, issued weekly by the National Health Council, 50 West 50th St., New York City.
2. American Public Health Association bibiliographic booklet.
3. Bauer and Hull (book) *Health Education of the Public*, W. B. Saunders, 1937.
4. Bibliography of the Massachusetts State Board of Health.

II. *The Sub-Committee on Methods proposes*:
   - A. A general fact-finding inquiry concerning methods of teaching college hygiene now employed in the member institutions of our Association.
   - B. A more specific and more personal inquiry addressed to those institutions or individuals who seem to be doing original or interesting things in this area.

On the basis of this effort at fact-finding and selection, together with whatever constructive proposals can be formulated, it is hoped that some variety of helpful suggestions as to methods may be submitted at our 1939 meeting.

Submitted by the Committee on Informational Hygiene:

A. G. Gould, M.D.
C. E. Turner, M.D.
Warren Forsythe, M.D.
Frances Scott, M.D.
Mary DeKruif, M.D.
Amelia Wood, M.D.
Prof. T. Bruce Kirkpatrick, *Chairman*.

Book Reviews

Surgery of the Ear, by Samuel J. Kopetzky and Sixteen Contributors; 468 pages, 4 color plates and 292 illustrations; New York City: Thos. Nelson & Sons. Price, $12.00.

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Surgery of the Ear, published in loose-leaf form, edited by S. J. Kopetzky, consists of a series of articles by various authors. There is some repetition, due to several writers covering the same ground. For example, "Surgical Anatomy of the Temporal Bone" is discussed in a separate article by O. V. Batson, while H. J. Williams, in his article on the "Surgery of Acute Suppurative Tympanomastoiditis," again reviews the surgical anatomy.

The contribution of H. I. Lillie on the "Surgery of Otitic Sepsis" is excellent, as is that of G. Holmgren on "Surgical Therapy in Otosclerosis." This latter will perhaps be one of the first articles to be supplemented with loose-leaf additions, as it is still very much in the experimental stage. The article on "Surgery of Suppurative Meningitis" by James Dwyer is interesting in that more space is devoted to the use of sulfanilamide than to surgery.

The subjects of facial nerve surgery, plastic surgery, and surgery of suppurative petrositis are satisfactorily covered. W. E. Dandy has contributed an article, in his authoritative style, on the "Surgery of Mènière's Disease." E. Sachs' article on "Surgery of the Acoustic Nerve" is also well worth while.

For the practicing otologist, as well as the advanced student in otology, this book offers a good review of the recent advances in surgery of the ear. It promises to keep up with the future progress by means of the loose-leaf feature.

"A Symposium on Cancer," University of Wisconsin Press.

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The Institute of Cancer conducted by the medical school of the University of Wisconsin, in 1938, published a *Symposium on Cancer* which is very enlightening on the subject of cancer. The institute was addressed by Levi Kreyberg, of Oslo, Norway; Clarence C. Little; Madge T. Macklin; Edgar Allen; Howard B. Andervont; James Ewing; Henri Coutard, Paris; Warren Lewis; Stanley P. Reimann; James B. Murphy; and Emil Novak.

The first named gave a most interesting method of studying the tar cancers produced in mice. His findings are especially interesting in regard to the heredity of cancer. Little discussed at length the various factors to consider in the etiology of tumors. His experimental work is also concerned with the production of cancer in mice with irritants. Dr. Madge Macklin of Ontario discussed the familial incidence of cancer. She cites many cases among human beings to show that it does have a hereditary tendency.

Allen discussed the relation of ovarian hormones and the development of atypical growths and malignant tumors. He believes that injections of oestrogens have tended to render the individual more susceptible to malignant growths. Andervont discussed carcinogenic substances other than tar in the production of tumors in laboratory animals. Macklin again discussed the pros and cons of irritation as a cause of cancer. Ewing discussed the importance of early diagnosis and treatment and the necessity of public education in the control of cancer. He also brought out vividly the methods and indications of biopsy in the diagnosis of tumor.

Novak discussed cervical cancer, especially, from the point of view of early diagnosis and most reliable treatment. Henri Coutard called attention to the fact that there are radio sensitive and radio resistant tumors of the breast. His discussion of cancer of the breast as to the proper application of surgery or radium and X-ray is very interesting and well founded.

The Symposium as a whole is very enlightening. It gives an up-to-date discussion on cancer from every angle by some of our best recognized authorities.

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UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

The JOURNAL-LANCET is pleased to devote this issue to the Fiftieth Anniversary of the University of Minnesota Medical School, not only because the recording of the history of such an institution is of great value but also because this special event was of national significance. A large number of speakers from various parts of the nation, each one expert in some particular phase of medicine, was invited to participate in the program. All accepted the invitation, which testifies to the importance of this occasion. For two and one-half days papers and clinics were presented, which included the last minute information on various subjects. The committee in charge manifested much wisdom in arranging for continuity throughout the program rather than presenting a haphazard group of papers. The general theme was "Some Trends in Medical Progress, with Particular Reference to Chemistry in Medicine." Certainly, there is no more important phase of medicine than that pertaining to chemistry. Abstracts containing the important facts in these papers provide the readers of the JOURNAL-LANCET with advance information. The complete papers are being assembled and will later be published in book form by the University of Minnesota. This volume should be in great demand by physicians and scientists everywhere because of the high quality of the papers and the vast store of information they contain.

The Medical School of the University of Minnesota has passed through an interesting period of evolution. At times there were discouragements and progress seemed slow; at other times the development was rapid. Generally speaking, the foundation was well laid by persons who devoted much time and effort to the institution and made many personal sacrifices. The contributions of all such persons, whether they be governors of the state, members of the board of regents, presidents of the university, deans, professors, and other members of the full-time or part-time teaching faculty, or whether they be mechanicians, engineers, janitors, etc., are fully

recognized by the administration, which also realizes that without them the school could never have reached its present state of development. Those who have been on the campus twenty-five years or more have seen much progress, not only in numerous additions to the physical plant, but also in the enlargement and improvement of the faculty and other divisions of the personnel. These persons agree unanimously that at the present moment, under the Deanship of Dr. Harold S. Diehl, the school occupies the highest position in its entire history.

J. A. M.

THE FEAR OF DEATH

Nicodemus went to Christ in the night in search of everlasting life. Ponce de Leon roamed the New World, seeking the fountain of perpetual youth. Steinach severed the *vas deferens* in an effort to rejuvenate old men and stimulated interest in gland transplants and gland fathers. Life has always been held in precious esteem, but when we want to live a long time, do we not have in mind its perfections and forget to count its disappointments?

Owen Meredith gave us in poetic verse "The Apple of Life." The theme was that whoever ate the apple would be assured of never dying but of living forever. The author described how several persons in different stations of life reacted to this proposal. The apple was first offered to King Solomon. After careful consideration of the consequences, he rejected it but passed it on as a favor to his fair Shulamite. She reached the same decision herself and gave it to her prince. The prince, after due deliberation, did not want it and tendered it to his Egyptian sweetheart, who in turn carried it to King Solomon. Thus, the wisest of all men renounced it twice. Each person, after debating the advantages and disadvantages of the mysterious charm, voted against the responsibility of changing Nature's course.

William Cullen Bryant in "Thanatopsis" and Robert Louis Stevenson in "Requiem" show a beautiful resignation toward death. As physicians, we see men who die with a smile—they are said to be brave. We see those, who, after lingering illnesses, welcome the end, while many are wrapped in the kindly mantle of insensibility that deprives them of feeling and fear.

Fear of death is a motivating factor in the calling of the doctor who sometimes prolongs life, sometimes dispels fear, but always comforts the patient and relieves the pain that may be incidental to the ravaging processes of dissolution. He does all this knowing full well that no one can live forever. Let us be reconciled to believe that it should be as it is. After all, it is not so much a question of how long we live but how well.

A. E. H.

NARCOTIC RACKET

All of us have been approached by narcotic addicts who ask for drugs. It is easy to say "no" to these persons. However, a great many times it is difficult for a physician to determine whether one is dealing with an addict or a very ill person who needs a narcotic for the relief of pain.

Narcotic addicts tell varied stories. One that has been worked successfully in several places in eastern South Dakota during the past month, I think is worth recounting in order that physicians may be on the lookout for it.

This particular man is tall and slender, dressed moderately well and purports to be an employee of an electrical service company out of Omaha. He is apparently in considerable pain and tells that he had been under a doctor's care in Omaha for gallbladder attacks some months previous for which this doctor gave him some little tablets under his tongue. He apparently knows about nitro-glycerine for treatment, stating that the physician had given him that first but it did not do him much good. In order to afford relief, he states that the doctor gave him other little tablets which dried up his mouth. After that he took caroid and bile tablets and had not had any more trouble until this time.

He has a room in a private home in the community where he is and states that his boss will be in the next day and the company allows three dollars a day for sickness. The next day he comes back saying he is a little better but still has considerable pain, and needs more drugs. If only a small amount of morphine is given, he comes back the same day with the box all wet saying that the land lady had knocked the box into the slop jar, and destroyed them. About the next day he usually has gone off without paying his rent. Occasionally he will go to a phone in the city somewhere and call the physician saying that he is the foreman for the electrical company, and guarantee payment.

C. E. S.

Book Reviews--Continued

The 1938 Year Book of General Medicine. Infectious Diseases edited by George F. Dick, M.D.; diseases of the chest by J. Burns Amberson, Jr., M.D.; diseases of the blood-forming organs by George R. Minot, M.D., and W. B. Castle, M.D.; diseases of the large blood vessels by William D. Stroud, M.D.; diseases of the digestive system and metabolism by George B. Eusterman, M.D. Chicago: The Year Book Publishers. Price, $3.00.

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Once again the story of medical progress during the year 1938 is reviewed by the *Year Book of General Medicine*. The outstanding feature of this volume is the inclusion of 151 disease conditions encountered most often in the office of the physician and at the bedside of the patient. The objective of this *Year Book of General Medicine* is to offer to every general practitioner and to every specialist in various fields the most advanced procedures that occurred in medicine during the year 1938. The editors have filtered thousands of articles from hundreds of journals and their personal selection of the articles included in this volume should be evaluated against their wide clinical experience. The 1938 *Year Book of General Medicine* performs two important services: It is a general medical review for the busy practitioner, and enables him to cover a wide variety of subjects that otherwise would be impossible for him to read; secondly, this volume, with those that have preceded it, is a permanent file of medical contributions.

Societies

SCIENTIFIC PROGRAM OF THE MINNEAPOLIS CLINICAL CLUB

Meeting of February 9, 1939

DISCUSSION OF THE CLINICAL FEATURES OF PULMONARY INFARCTION

T. A. PEPPARD, M.D.

MINNEAPOLIS, MINNESOTA

For the purpose of discussing the subject of Pulmonary Embolism I have selected a small group of patients' records and prepared a chart summarizing the salient features of each. I shall try to point out and emphasize some points of interest and importance in the clinical course of this condition.

The postoperative pulmonary complications are most commonly: (a) infectious (as bronchopneumonia), (b) massive collapse or atelectasis, (c) embolism. Embolism may be of the massive type resulting in sudden death, usually within a very few minutes. While no one of us has a lot of these cases in his private practice, those we do have are all too harrowing. They occur, as a rule, from 10 to 14 days following traumatism, or after operation or delivery, rarely after the 21st day, occasionally from the fifth to the seventh day. They thus differ in the time of their occurrence from bronchopneumonia or atelectasis, which usually appear on the first or second postoperative day. More often than not the embolic occlusion occurs suddenly, without warning, though on occasion one or more minor episodes representing blockage of smaller vessels may precede the major event. As a matter of fact there undoubtedly are many instances of embolism in smaller vessels which pass unnoticed or at least undiagnosed. A sufficiently large non-fatal embolus induces a state of shock, with greatly lowered blood pressure, rapid, weak, thready pulse, shallow and usually rapid and painful breathing. There is pallor, profuse perspiration, some degree of restlessness, and almost invariably great apprehension on the part of the patient. Cough is not particularly prominent. Sputum is not abundant, and inasmuch as hemoptysis is always emphasized, it should be noted that bloody sputum may or may not occur, may be very small in amount, and is more apt to appear 24 to 48 hours after the accident. Instead of sharp pain, there is more often a marked sense of oppression over the chest. The condition of the patient is such that it precludes any exhaustive physical examination. Few physical findings may be elicited for the first 12-24-36 hours, after which there may be heard a pleural friction rub, and signs of increased density in the lung.

In addition to occurrence of pulmonary embolism as a postoperative complication, following trauma, after delivery, I want to emphasize in particular the frequency of its appearance in cases of heart disease, and cardiac decompensation.

In Dr. McCartney's 1927 paper, he reviewed 73 autopsied cases of pulmonary embolism, of the department of pathology of the University of Minnesota, between the years of 1910-1927. Fifteen of these were post-traumatic, an additional 8 post-traumatic with subsequent operation, 31 postoperative, 3 postpartum, and 16 medical. Of the medical cases 6 were hypertension, with cardiac failure, and in 4 of the 6 the source of the embolus was from the right auricle; 1 additional from the right auricle and vena cava, and 1 from the common iliac. In 1935 Dr. McCartney reviewed the cases from 1927-1933. Here he paid attention particularly to injuries. Of 9781 necropsies, 1499 or 15 per cent were deaths from injuries. There were 61 cases of pulmonary embolism; traumatic emboli represented 20 per cent of the total pulmonary emboli; and 80 per cent of the post-traumatic emboli came from injuries of the lower extremities. While, as might be expected, many more men than women were involved in accidents, embolism following trauma is decidedly more common among women. He suggested that the higher incidence of varicose veins in the female might be responsible. Among those persons dead of post-traumatic embolism the incidence of anatomical heart disease is significantly higher than it is in persons dead of trauma without embolism.

Ware & Bullock reported 207 instances of pulmonary emboli among 7632 autopsies at the Los Angeles General Hospital. Eighty-one per cent of the total number of deaths from this condition occurred in patients over 40 years of age. There were more embolic deaths among medical cases than among postoperative or traumatic cases. Heart disease and decompensation were the most frequent causes. Besides the picture of shock with cyanosis and a sense of substernal pressure, the author, as others have done, emphasizes the evidence of right heart failure, and the occurrence at times of a to-and-fro rub over the base of the heart.

Eliason and McLaughlin report 120 pulmonary complications and 39 deaths out of a total of 7326 cases. Respiratory tract infections at the time of operation increase the possibility of pulmonary complications. Of the 120 cases, 45 were bronchopneumonia, 23 atelectasis, 19 lobar pneumonia, and 9 embolism.

Craft reports 49 cases of fatal pulmonary embolism from 1928 to 1938 at the University of Minnesota Hospitals. The average age of these patients was 55 years. Sex incidence showed 61 per cent males and 38 per cent females. Fifty-one per cent occurred in the medical group, 42 per cent in the surgical, and 6 per cent in the gynecological group. Both lungs were involved in 51 per cent of the cases, and when only one lung was involved it was most commonly the right. Cardiac disease was present in 67 per cent of the cases. According to the theory of Aschoff there are four main factors in the production of thrombosis: (1) changes in the blood flow, (2) changes in the blood plasma, (3) changes in the blood elements (increased or decreased power of agglutination), (4) changes in the walls of the vessels.

Rigler, Jensen and Nessa reviewed cases of pulmonary infarcts over a two year period, 1936-1938, at the University of Minnesota Hospitals. There were 17 cases, 9 males and 8 females; the median age was 51. Dyspnea was the most prominent symptom in 11, pain in 5, and hemoptysis in 1. Fifteen of the cases were on the basis of cardiac failure. They point out, as have others, that the roentgen appearance of the lesion may vary considerably, in fact may not present a demonstrable shadow at all, and agreed that pulmonary infarction is not necessarily excluded because of lack of demonstrable X-ray findings.

Averbuck reports six autopsied cases, all of which were misdiagnosed coronary thrombosis. In discussing these cases, the author emphasized the fact that there is no radiation of pain; that the liver may be observed to enlarge rather rapidly, and the heart rapidly dilate to the right.

Barnes, White and McGinn have called attention to a characteristic electrocardiographic tracing obtained in cases of pulmonary embolism, and point out distinguishing features from the tracings in coronary artery thrombosis.

The chart summarizes the essential findings in a selected group of 13 cases, 6 males and 7 females. The ages varied from 18 to 75 years.

The first case is that of a robust young woman of 31 who had a laparotomy for the removal of a uterine fibroid. The operation was not attended by any unusual difficulties, and for ten days her convalescence was exceptionally uneventful. On the evening of the tenth day, she had a sudden seizure and died within five or ten minutes.

The second case is that of a *66 year old woman*, who entered the hospital for a general examination. A couple of months before she had had a mild infection, which had been called influenza. On June 26th, while sitting in a chair, she had a sudden collapse, with marked respiratory distress, moderate cyanosis, and moderate drop in blood pressure. Following this she ran a low grade fever for perhaps ten days. A pleural friction rub was heard at the base of the left lung, she spit up small amounts of blood 24 hours after the attack. On July 11th there was an entirely similar episode, followed by the development of physical signs in the base of the right lung.

I was entirely at a loss to account for the source of the emboli. On July 29th she for the first time showed definite evidence of thrombophlebitis in the left femoral vein. This patient lived and has remained well since.

The third is that of an 18 year old boy who at autopsy was found to have a bacterial endocarditis, the pulmonary valve only being involved, this vegetative lesion being the source of multiple pulmonary infarcts.

The fourth, a 40 year old woman, had cardiac decompensation. We were never sure as to the reason for her cardiac failure. At autopsy, the heart weighed 400 grams, valves were normal, there were mural thrombi in both right and left ventricles with infarcts of the kidney, spleen and lung.

The fifth, a 70 year old man, was admitted to the hospital May 13, 1938, because of congestive heart failure. Two days later there was an episode consisting of great dyspnea, cyanosis, rapid pulse, drop in blood pressure, expectoration of blood, mixed with pus. The patient's condition was critical. I was in doubt at first as to the reason for the sudden onset of these symptoms. The following day pneumococcus type three was identified in the sputum and the X-ray showed multiple areas of density scattered through both lungs. After the use of type III antipnuemococcic rabbit serum the temperature rather promptly returned to normal. There was uneventful recovery and the X-ray showed clearing of the pneumonia densities. November 12, 1938, following an upper respiratory tract infection, there was a sudden onset of right sided chest pain, weakness, and fever; there was shortness of breath, moderate cyanosis and expectoration of blood. These two attacks were rather strikingly similar, however the X-ray appearance of the lung was quite suggestive of infarction and after 18 hours the temperature, which had risen to 101.5, returned to normal. There was no further bloody sputum and the patient remained well, and was discharged from the hospital after a few days.

The sixth was a 54 year old woman, who had a hysterectomy performed November 9, 1938. On November 19th, there was sudden onset of chest pain, dyspnea, cyanosis, shock, blood pressure 80/60. There was no expectoration of blood. A few days later pain developed in the other side of the chest. Physical findings as well as X-ray showed areas of increased density. She had a moderate fever and leucocytosis. Four or five weeks later, after a very stormy time, there was development of bilateral lung abscess. The patient became well enough to be discharged from the hospital the latter part of January 1939, and has continued to improve.

The seventh—(this case is unique)—a previously well, robust, athletic woman, 30 years of age, underwent a cesarean section February 7th. February 16th there was a sudden attack with rapid shallow respiration, cyanosis, pallor, shock, with drop in blood pressure, sense of pressure beneath the sternum, great apprehension. She subsequently expectorated a small amount of blood. February 24th there was a similar occurrence (though much milder), in the opposite lung. There followed a very stormy interval, during which time she had a septic temperature, and leucocytosis as high as 53,000. The hemoglobin which had been normal dropped to 50 per cent, and there appeared, first in the left chest, and subsequently in the right, signs of pleural fluid, which on aspiration was clear, amber colored, and sterile on continued incubation in ordinary broth. Guinea pigs were inoculated and developed tuberculosis. After the fluid receded the X-ray showed characteristic densities in both lower lobes. The patient was kept at rest, and has now remained well for four years.

The eighth—a young man with old healed rheumatic valve defects of the mitral and aortic valves, with severe congestive failure. There was sudden death. Autopsy showed pulmonary embolism.

Case 9—a male aged 76 who had previously had slightly elevated blood pressures had an electrocardiographic tracing within normal limits in January. Occurrence of coronary occlusion on May 6th. On May 11th he had an attack of extreme dyspnea, cyanosis, anterior chest pain not referred—the duration was short and inhalation of oxygen gave relief. After one day roentgenologist reported a small amount of infiltration at the base of the right lung. On May 15th the sputum contained some blood streaks. May 17th there were physical and roentgenological signs of consolidation in both the right and left lower lobes of the lungs. By May 29th the patient's general condition was greatly improved in every respect. The afternoon of that day without warning he had a sudden seizure, gasped for breath, became cyanotic, pulseless, quickly became unconscious and died within a few minutes. Though autopsy could not be obtained I am convinced that the final episode consisted of a massive embolism of the pulmonary artery the source of which was a mural thrombus in the right ventricle.

The remaining cases are somewhat similar to the others. Case 10 is a 54 year old male, a railroad man, who suffered an intertrochanteric fracture of the right femur October 28th. His progress was uneventful until he had an acute "cold" on January 22nd, followed in a few days with signs of pneumonia and a pleural friction rub. On February 2nd there was sudden collapse, death ensuing two days later. Autopsy. Case 11, a 56 year old female, had an extensive operation for leukoplakia vulva. Attack followed April 4th from which she recovered. Case 12 was a 54 year old male with hypertension, myocardial degeneration and congestive heart failure. Death. Autopsy. Case 13—a 75 year old female who had hypertension and myocardial degeneration. January 1st she suffered a hemiplegia and on the 15th developed signs of increased density in the thorax. She lived three weeks and then expired. Autopsy.

Of the 13 cases, there are 7 cases of heart disease, 4 of these being hypertension with coronary sclerosis and myocardial degeneration, 1 unexplained, 1 with old healed rheumatic valve defect, and 1 with bacterial endocarditis. Five of the 13 recovered, and have remained well. Six came to autopsy.

In summary I desire to emphasize:

1. The frequency of occurrence of pulmonary embolism in medical practice principally as a complication of heart disease. Pulmonary embolism may be the terminal episode and cause of death in (1) congestive heart failure and in (2) cardiac infarction. Pulmonary embolism may be a complication of, or be complicated by pneumonia. Pulmonary abscess may be a sequel to pulmonary embolism and infarction. Cardiac disease contributes to the likelihood of the occurrence of pulmonary embolism as a postoperative complication.

2. The clinical state of shock which quite regularly accompanies pulmonary embolism.

3. The fact that blocking of small vessels may occur more often than is realized.

4. The source of the embolus need not be at once apparent.

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Meeting of April 13, 1939
E. S. Platou, M.D., Presiding

THE METRAZOL CONVULSION THERAPY OF THE PSYCHOSES

JOSEPH C. MICHAEL, M.D.
MINNEAPOLIS, MINNESOTA

The original work with metrazol convulsive therapy was reported by Von Meduna in July, 1935. He expressed the theory that convulsions bring on a change in the metabolism which is capable of altering the course of schizophrenia. It had been known that essential epilepsy implies an inhibition of oxidation and a disturbance in protein metabolism resulting in an accumulation of nitrogenous end-products, which are removed by the seizure. Investigations through animal experimentation have shown that metrazol constricts the blood vessels of the vital centers and thus precipitates the epileptiform convulsion. With the seizure there comes a hyperacidity which in turn brings on a dilatation of the blood vessels to normality. Early animal experiments failed to reveal brain damage.

During the last two years the literature has become quite laden with reports on the principles, technic, precautions, complications, etc., of this method. I wish now to dwell mainly upon clinical observations and therapeutic results. The subjects of this brief report were confined either in the local private psychiatric hospital or in the division for psychopathic patients in the Minneapolis General Hospital during the last one and one-half years. Insulin shock therapy was employed exclusively during the preceding year.

TABLE I

	Schizophrenia — Total Group				
	Satisfactory Improvement	Good Improvement	Little Improvement	No Improvement	Relapse
Public Hosp. Cases	2	4	0	6	1
Private Cases	8	2	4	0	4
Total	10	6	4	6	5
Per Cent	38.5	23	15.4	23	

TABLE II

	Manic-Depressive — Total Group				
	Satisfactory Improvement*	Good Improvement	Little Improvement	No Improvement	Relapse
5 Cases	4	0	0	1	3

* immediate.

SELECTION OF PATIENTS

In our series are included twenty-six schizophrenics, five manic depressives, one paranoid state and one psychoneurotic. Definite or suspicious impairment of the cardiovascular, pulmonary or osseous systems, recent head trauma and other organic nervous system disorders, metabolic irregularities revealed by blood and urine examinations, the presence of fever whatever its cause, or long bed confinement and inanition, were considered adequate reasons for rejection. To indicate how many patients in a psychiatric hospital under current routine circumstances are selected for shock therapy, it should be stated that the subjects thus treated usually ranged no higher than 10 to 15 per cent of the entire group hospitalized because of mind disorder at one time. Marked constitutional types, or cases with chronic impairment of many years duration, were as a rule not accepted for this method of therapy.

Seven of the above schizophrenic patients were subjected to a variable number of hypoglycemic shocks without success, after which the convulsions were induced. Four of these patients ultimately recovered.

COMPLICATIONS

In the literature these are dealt with as (1) mechanical, viz.: fractures and dislocations and (2) inflammatory, embracing the reactivation of latent tuberculosis, myocardial reactions, pulmonary or other abscesses. Their incidence has been calculated to have occurred in 2.2 per cent of total patients treated. The mortalities reported until recently are computed by Von Meduna and Friedman to indicate a rate of 0.29 per cent.

During the treatment of these thirty-three patients dislocation of the jaw occurred twice in one subject and once in another. The convulsive periods in one man, a 47 year old farmer, were characterized by a more prolonged apnea than was observed in other patients. The case was one of catatonic stupor. Fair recovery followed the thirteenth shock.

COMMENT

A list of 1465 cases of schizophrenia collected from the American literature by Von Meduna and Friedman reveals that all types combined show a remission rate of approximately 20 per cent and "good improvement" in an additional 38 per cent. The remission rate in 210 "acute cases" on the other hand was 60 per cent. When we note this recovery rate in cases of recent onset we should bear in mind that without shock therapy it is possible to gain good remissions in at least 20 per cent of this particular group of patients.

The tables show that the convulsive therapy in a small series of manic types of manic depressive psychoses are not noteworthy. One patient, a woman age 37, made a phenomenal recovery; one young woman, 19, failed to show more than temporary recession; the other two were favorably influenced to a point where manic symptoms subsided for two or three weeks. In one, relapse occurred twice, in another three times. We thus know that the manic phase is less likely to be favorably influenced than the depressed. However, better results tend to be obtained in cases of the noncircular types of depressions. Here again it should be recalled that a relatively large proportion of the affective group are ultimately recoverable without the aid of shock therapy.

For the convulsive therapy in cases of paranoia one can make claims in only very modest terms.

More encouragement is derived from the one case of so-called agitated neurasthenia. The tendency to relapse in the affective group was demonstrated in this instance. However, recovery followed one relapse.

As to relapses in the schizophrenia treated cases, in three of these, subsequent convulsive treatment was followed by recovery and in two other cases no benefit was obtained from further follow-up treatment.

It is still too early to determine the extent of damage to the central nervous system and other systems which may take place in subjects who present no apparent complications after a course of successful treatment.

This therapy has been undertaken in each case after considerable forethought and rather exhaustive investigations. The technical treatment details are of less concern than the many factors having to do with selection of suitable patients, continuation of treatment, as well as general and special psychiatric management. We are getting some favorable results hitherto impossible, yet our experience thus far tends to temper the overenthusiastic claims indicated in some of the earlier reports.

Discussion

Dr. R. BIETER: I think the theory that the metrazol works by causing an irritation or producing a metabolic change is as good as any. I wonder if any of the vitamins in extremely large doses have been used, either alone or with metrazol. Maybe the B group with or without vitamin C. Theoretically they may be of value and I am wondering if they have been used.

Dr. J. C. MICHAEL: We haven't used that in connection with metrazol therapy.

Dr. R. BIETER: If you were to try it I would say use rather large doses intravenously.

Dr. J. C. MICHAEL: How about intraspinally?

Dr. R. BIETER: I don't know.

Dr. LEO G. RIGLER: Are you using this at all in the constitutional psychoses of the functional type?

Dr. J. C. MICHAEL: There is a limited border-line group of patients with psychoneuroses or minor psychoses, who are refractory to all kinds of treatment and it seems that with this therapy we can do something we have not been able to do before. I have not had much opportunity to try it except that one outstanding case in which we got a splendid result and I know from my experience, the way we used to handle those cases years ago, we had them in hospitals for months and months and did not seem to get any place and here we give them a few injections of metrazol and get a significant change in personality.

I have one case in a private hospital, a woman from a neighboring state, who had with her depression, an anorexia; she

began to lose weight until she was down to 70 lbs. We fed her forcefully including vitamins and minerals in the diet and thus got her weight up to 90 lbs. Just recently I have given her four metrazol injections and now she is improving very nicely. Today I was able to write a letter to her husband that she is now really showing a promise to get well. It is just remarkable.

I know we have obtained recoveries in schizophrenia in the first attacks, perhaps in 20 per cent of the attacks, without shock treatment; I don't know, nobody knows what the true spontaneous recovery rate is in schizophrenia. It depends on how you group your cases and how you diagnose your cases. We are not very desirous of treating the hopeless patients.

You can say this definitely, during the early stages of schizophrenia we can do a lot in a great percentage of cases. I think the figure of 60 per cent satisfactory recoveries with but few remissions is not greatly exaggerated.

Dr. J. C. DAVIS: Have you any ideas as to what height the blood pressure may rise?

Dr. J. C. MICHAEL: Yes, experimental work has shown that in two minutes following the injection the systolic blood pressure will rise 40 mm., in five minutes the systolic pressure tends to return to normal and at sixty minutes it drops approximately 35 to 40 mm., the lowest reading. The diastolic pressure reading as well as the pulse and respiratory rates show similar fluctuations.

Dr. NATHANIEL LUFKIN: A number of investigators have described gross and microscopic changes in the brain resulting from hypoglycemia in humans and in animals. These works were recently reviewed and summarized by Dr. A. B. Baker, of the department of neurology at the University of Minnesota. Dr. Baker also presented his own studies on clinical cases and described the results of his experiments with animals. In this work he demonstrated that a number of different types of pathologic lesions may result.

Perhaps the least serious of the lesions is chromatolysis and loss of Nissl substance in the ganglion cells of the brain. Such alterations may be found with fair regularity in animals killed during and immediately after hypoglycemic shock. They represent an acute, probably transient change. Another change which has been described in both acute and chronic hypoglycemia is the presence of petechial hemorrhages. In most instances these hemorrhages are few, very small, and scattered, and result in no permanent functional impairment. Occasionally they are numerous and confluent. In such cases there is little question that more or less functional impairment must result. Severe gliosis of the brain, diffuse or localized, may also occur. In certain brains this reaction has been so severe that the microscopic appearances strongly resembled those of glial tumors. Large and small areas of cystic degeneration are very spectacular, but rare. Yet such lesions are capable of producing profound functional alterations.

I recall one case of dementia praecox which developed a marked and apparently permanent mental impairment following hypoglycemic shock. It is probable that the brain of this patient suffered from one of the more severe types of injury just mentioned.

I have no knowledge of any publications dealing with pathologic changes in the brain resulting from the administration of metrazol, but Dr. Baker tells me that there is substantial evidence that metrazol may cause exactly the same changes that have been attributed to hypoglycemia.

From the pathological standpoint, therefore, it would seem that the use of convulsants is not without danger, and that these drugs should be administered only by experts with the greatest of care.

Dr. J. C. MICHAEL: When we find such changes in the diabetics who have spontaneous hypoglycemia we need not be surprised, we should anticipate them.

I will say this, I am not alarmed at all by the possibility of such findings in the brain, I sort of expect that. With our metrazol cases we have not had a death so we have not had an opportunity to do any necropsy studies. Nor have we had a death in our insulin therapy. We have just been lucky. I do recall that the very first patient, a woman in her thirties, treated at the General Hospital, had a protracted coma; she developed hemiplegia She had been a private patient of mine several years previously and had made a recovery from two previous attacks of psychosis without shock therapy. We had to send her on to the State Hospital this time and that looked like a bad experience. I had quite a time to inject new enthusiasm among my junior associates in the hospital to continue this treatment. The end of that particular story is this,—about seven months after she was sent to the State Hospital she returned back home and is well at this time, as far as I know.

There is another point, one of our distinguished neurologists in the East has been actually operating on brains and doing partial excision of frontal lobes on patients who have persisting obsessive trends, and has reported seemingly good results. We should not be so alarmed about what the pathologists can find in some of these brains and what the clinician naturally expects may occur, not if we bear in mind what we have to deal with. We are dealing with something that looks hopeless, the kin are feeling panicky and ask that we do something. Once in a while in chronic cases we get a surprisingly favorable result, once in twenty perhaps. *This type of treatment is emphatically not free from probable serious complications.*

Dr. J. C. DAVIS: I have a patient now who developed symptoms of coronary thrombosis three hours after a metrazol convulsion. Recent work reported in the literature indicates that some cases of coronary thrombosis are preceded by hemorrhage in the wall of the coronary artery produced by rupture of a capillary. Perhaps there is a very high rise in blood pressure during the convulsion which might rupture a capillary in the wall of a coronary artery.

CHEMOTHERAPY OF PNEUMONIA

J. C. MILLER, M.D.
MINNEAPOLIS, MINNESOTA

Observations of the bacteriostatic effects of sulfanilamide in vitro experiments by Colebrook and Kenny,[2] Long and Bliss,[8] Lockwood,[7] and others, have suggested several possible actions of the drug upon certain bacteria, prominently the hemolytic streptococcus. Attempts to cure experimental infections in mice with sulfanilamide and its derivatives have been made by many workers. Evidence has been presented suggesting the effect as a neutralization of toxins, interference with the metabolism of the bacteria, and aid to phagocytosis. None of these beliefs has been confirmed. Results have been particularly favorable with the hemolytic streptococcus and meningococcus, but survival rates are variable and difficult to correlate because of differences in methods used. Early experimental observations in pneumococcus infections were less favorable, although Cooper, Gross and Mellon[3] reported benefit when working with type III infections. In most instances, optimum concentration of the drug in the blood seemed to be about 1 to 10,000 or 10 mmg. per cent.

The toxicity of sulfanilamide in mice, dogs and rabbits has been studied and 50 per cent lethal doses vary from 2 Gms. to 6.3 Gm. per Kg. body weight. In dogs doses of 6 Gm. per Kg. weight and upward were found by Custer[4] and associates to cause nausea, vomiting, diarrhea, acidosis, and ataxia up to twelve hours duration. The evidence of effect upon the central nervous system was thought to be due to edema of the brain and spinal cord found at autopsy. Toxic effects in man are commonly anorexia, nausea, dyspnea, cyanosis, lassitude, headache, dizziness and fever. Other less common manifestations such as jaundice, rash, leukopenia, hemolytic anemia, agranulocytosis and sulph-hemoglobinemia are thought to be due to idiosyncrasy to the drug, and indicate immediate withdrawal. The frequency of acidosis has led to the administration of equal doses of soda bicarbonate routinely. Sulfanilamide appears to be readily absorbed from the gastro-intestinal tract, and oral administration is the method of choice unless impractical because of nausea. Difference in effect may be due to variation in the portion of the drug acetylated in the body, this conjugated form having no therapeutic value. Attempts to determine a scheme of dosage have involved quantitative determination of both the free and conjugated forms in the blood.[9]

Until recently no clinical studies had been reported offering sufficient material for statistical purposes in treatment of pneumonia with sulfanilamide. Reports of single cases or small groups without controls were not impressive. Price and Myers[11]

have submitted a comparative study of 115 patients treated with sulfanilamide, forty patients who received anti-pneumococcus serum and 94 control cases given only supportive treatment. While these observations cannot be considered conclusive, the series was conducted with a thoroughness that permits a number of interesting considerations. The cases were largely alternated, lack of uniformity in the final figures being due to exclusion of moribund cases from the series and inability to secure serum for all types. Effort was made to type all cases, and where this was delayed, sulfanilamide was alternated with non-specific therapy. One is particularly impressed by the massive dose of the drug employed. Thirty grains were given per twenty pounds body weight during the first twenty-four hours, half of which made up the initial dose and the remainder divided equally every four hours for six doses. Subsequent twenty-four hour doses of fifteen grains per twenty pounds were maintained until the day following the fall of temperature to normal, unless contra-indicated by severe toxic manifestations. No initial dose exceeded 120 grains, and the drug was discontinued after five days when no beneficial effect was apparent. Blood sulfanilamide level of approximately 7 to 15 mmg. per cent was maintained by this dosage in a majority of cases. The mortality rate of the total series was 15.7 per cent for the sulfanilamide group and 30.8 per cent in the control group. For forty patients with pnemonia of types I, II, V, VII and VIII treated with the serum the mortality rate was 27.5 per cent, whereas in 57 patients in these types given sulfanilamide alone the death rate was 10.5 per cent. Average duration of the disease was slightly longer in those receiving sulfanilamide, yet the incidence of bacteriemia was higher in those receiving serum. This suggests the relative greater frequency of demonstrable bacteriemia in those types. Beneficial effects of sulfanilamide was suggested in earlier fall of temperature and pulse, especially in cases of shorter duration, but estimate of symptomatic improvement was difficult because of lassitude associated with the drug. Associated diseases were well distributed. The incidence of chronic alcoholism was surprising, a total of 66 in the series, but daily use of alcohol without regard to quantity was the deciding factor. Cyanosis, mild nausea and vomiting, headache, and lassitude were common, but interfered little in the course of treatment. Acute hemolytic anemia occurred after sulfanilamide in six cases. These responded well to blood transfusion. It is interesting to note that prior to onset of the anemia there occurred an abrupt increase in neutrophiles. A gradual moderate secondary anemia developed in a greater number treated by sulfanilamide than among the controls.

Early unfavorable reports of the effect of sulfanilamide upon experimental pneumococcus infections gave rise to a search for a more specific and less toxic derivative. Such a compound, sulfapyridine, was described by Whitby[12] early in 1938 under the name of M. and B. 693. His observation suggested its value not only with the streptococcus and meningococcus but also in pneumococcic infections in mice, especially in types I, VII and VIII. He held the opinion that sulfapyridine was less toxic and more effective in less dosage. Others[10] believe that its toxicity is considerably greater than thought to be by Whitby,[12] having used a soluble sodium salt of the drug. They infer that the observations of Whitby[12] were in reality due to lack of absorption, which appears to vary considerably.

Evans and Gaisford[5] investigated the value of sulfapyridine in 100 cases of pneumonia, reserving an equal number of alternate cases as controls. Early in the series 3 gms. were given daily for three to four days, followed by 1 Gm. daily for three days. A number of cases exhibited a secondary rise in temperature after return to normal. When in later cases 2 Gms. were administered as an initial dose, followed by 1 Gm. every four hours, this secondary temperature rise was not seen. Furthermore in some patients who received 9 Gms. during the first 24 hours, decline in temperature was more striking. The effect of this behavior was not studied in blood cultures. Decline of temperature and toxicity was gradual in most cases, but followed a rather distinct period of improvement noted within the first 48 hours in 60 per cent of the cases treated, whereas in only 34 per cent of the controls did this obtain. The maximum total dose was 25 Gms. in each case. Cyanosis occurred in about 25 per cent of the cases, methemoglobin in six of these. The effect upon the white cell count was not constant, even in those cases where dosage was higher. No agranulocytosis was seen. Empyema unaccountably occurred in six patients receiving sulfapyridine, with only one among the controls. Death rate was 8 per cent in the treated cases, 27 per cent in the control group.

Flippin[6] *and associates conducted a series of 100 cases of* typed pneumonia, employing doses suggested by Evans and Gaisford. Severe nausea and vomiting were more conspicuous, necessitating cessation of treatment in ten cases. Other patients with mild nausea seemed to tolerate the drug after the first day. Dehydration from vomiting was severe in a number of cases. Leukopenia and hemolytic anemia assumed to be associated with idiosyncrasy obtained in only two cases, but a moderate secondary anemia developed in several others. A drop in temperature and general symptomatic improvement appeared within 48 hours with striking regularity. The blood level of free sulfapyridine was determined in most cases and found to vary from 1 to 18 mmg. per cent in patients receiving the same dose, suggesting as in previous experimental work, variation in the conjugated form in different individuals. An interesting consideration here is the greater frequency of rapid fall of temperature in the group with lower concentration. Moreover, there was uniformity in duration of the illness. Since the series lacks controls, the mortality rate of 4 per cent is not conclusive, but three of these deaths were type III infection, of fourteen such cases treated. It is significant that the clinical response observed was similar to that of Evans and Gaisford.[5] Others[1] have observed similar effects in pneumonia in children, and found a conformity in the interval between initial treatment and fall in temperature.

The clinical evaluation of a drug in treatment of pneumonia is difficult because of the influence of so many factors upon the course of the disease and mortality rate. Most important of these are the age of the patient, duration and extent of the infection before treatment, associated diseases, and the apparent variation in virulence of the pneumococcus from year to year. Credit may erroneously be given the therapeutic agent where crisis is the deciding factor. Statistical data will be convincing only after long trial. The significance of side effects of sulfanilamide and its derivatives observed so widely must be established before general use is recommended. It has been suggested that the cyanosis associated with the drug may militate against benefit in extensive pneumococcus infection.

Most observers generally agree that the apparent clinical benefits of sulfapyridine in pneumonia encourage its trial, but only under circumstances permitting careful clinical observation and frequent routine laboratory procedures.

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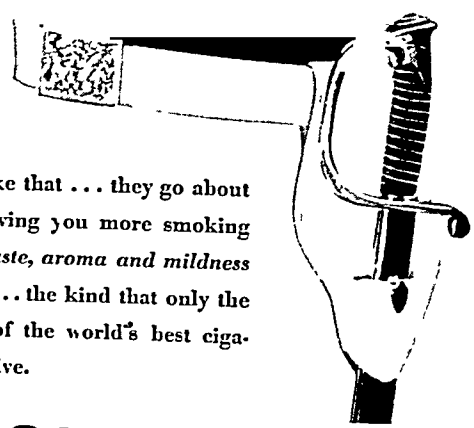
Discussion

This paper was discussed by Dr. R. Bieter whose article on this subject has been published in the JOURNAL-LANCET, Vol. LIX, No. 4, (April 1939).



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News Items

The American Student Health Association will hold its annual meeting at the Hotel New Yorker, New York City, on December 28-29, 1939.

Dr. E. M. Porter of Great Falls has been elected vice president of the Montana state board of health. He succeeds the late Dr. L. H. Fligman of Helena.

Dr. W. F. Sihler, Devils Lake, and Dr. Paul H. Burton, Fargo, were recently appointed to the North Dakota state board of medical examiners by Governor Moses. Dr. G. M. Williamson, Grand Forks, was reappointed.

Dr. Patrick E. Kane, Butte, Montana, has been appointed to the board of medical examiners for a term to end March 2, 1945. He succeeds the late Dr. J. A. Donovan. The appointment was made by Governor Ayers.

A crippled children's clinic for residents of Wadena, Wilkin and Otter Tail counties, Minnesota, was held at Fergus Falls October 28.

Dr. B. A. Dyar, formerly of De Smet, South Dakota, is now in Indianapolis where as medical supervisor for the Farm Security Administration he is supervising the medical program of eight states: Minnesota, Wisconsin, Michigan, Illinois, Indiana, Iowa, Ohio and Missouri.

The seventh in a series of postgraduate lectures for North Dakota physicians was conducted in Grand Forks October 24. Part of a state-wide program, the study was conducted by the North Dakota medical association's committee on maternal and child welfare, and was held under the auspices of the Grand Forks district medical society.

Dr. Gilbert J. Thomas, Minneapolis, was elected to the board of the American College of Surgeons at the meeting held in October.

The secretary of the North Dakota State Board of Medical Examiners, Dr. G. M. Williamson, announces that a directory of all physicians practicing in the state will be issued January 1, 1940, and mailed together with the annual registration card to all who have paid their registration fee for 1940. In order that the name and address may be correct in the directory, physicians are asked to complete the application card which accompanies the notice and return it promptly together with the fee early in December. Notice of annual registration is mailed from his office December 1, 1939.

Dr. Irvine McQuarrie, professor and head of the department of pediatrics at the University of Minnesota, will go to China about January 1 to serve as visiting professor in pediatrics at Peiping Union Medical school. Dr. McQuarrie was granted a leave of absence by the university board of regents and will return to the university next year.

Dr. H. Russell Brown, Watertown, was elected president of the South Dakota Health Officers Association at the annual meeting held October 4, 1939. Dr. Brown, who served as vice president the past year, succeeds Dr. Will E. Donahue of Sioux Falls. Other officers elected include: Dr. R. S. Westaby, Madison, vice president; Dr. J. F. D. Cook, Pierre, secretary-treasurer.

Dr. F. H. Poppe has been elected president of the medical staff of Northwestern hospital, Minneapolis. Other officers are Dr. George R. Dunn, vice president, and Dr. H. S. Trueman, secretary-treasurer.

Dr. E. W. Wahlberg, formerly of Morgan, Minnesota, is now in Sleepy Eye where he purchased the practice of Dr. J. L. Ryan.

Officers of the newly organized Minnesota Medical Foundation are: Dr. E. S. Platou, president; Dr. M. B. Visscher, vice president; Dr. R. L. Wilder, secretary; and Dr. J. C. Litzenberg, treasurer. (For complete story see page 490 of this issue).

Dr. A. F. Jensen of the Healy, Law, Woutat, Moore Clinic, Grand Forks, North Dakota, has successfully passed the examination of the American Board of Ophthalmology and has been granted its certificate. Dr. Jensen took his postgraduate work in ophthalmology at the University of Pennsylvania Graduate School of Medicine and in the Illinois Eye and Ear Infirmary before joining the Clinic at Grand Forks. He formerly practiced at Rugby, North Dakota, for a period of ten years.

Necrology

HENRY O'KEEFE
1855-1939

Dr. Henry O'Keefe was born at Lindsay, Ontario, March 14, 1855, and died at St. Paul, Minnesota, September 2, 1939. He was a graduate of the McGill University of Montreal in 1882 and first began practice at Minto, North Dakota, in the same year. He remained there until 1906 at which time he moved to Grand Forks where his practice continued until the time of his death.

He was thus, so far as is known, the oldest practitioner in point of service in the state. He was an honorary member of the Grand Forks district medical society and the North Dakota State Medical Association.

Dr. O'Keefe was an ideal family physician, kind, considerate, skillful; and in addition was friend, confidant, counselor and comforter to his people. His sympathetic touch, inspiring words and assuring smile were potent remedial measures often more effective than the resources of pharmacy. He was public spirited and gave freely of time and means for community interests. He was a valued member of society, kind and helpful to his family, true to his ideals and loyal to his friends, profession, country and Church.

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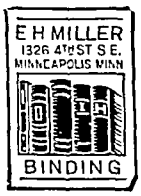
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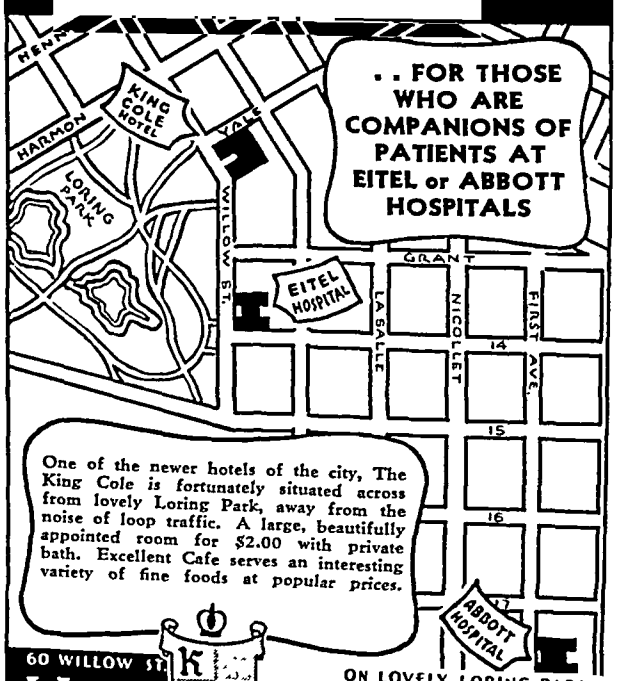
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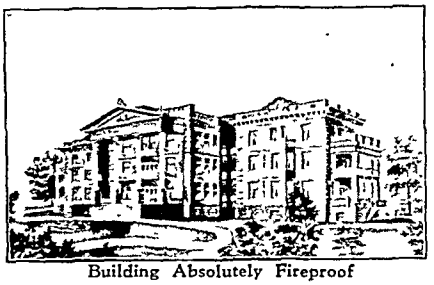
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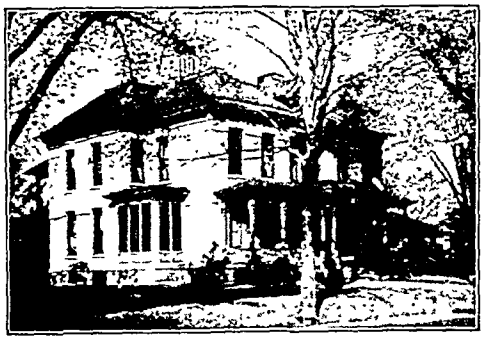
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ADM NUTRITION REVIEWS

VOL. I NOVEMBER, 1939 NO. 5

Chinese Materia Medica and Wheat Germ Oil

Wong and Wu have reviewed succinctly as follows the development of the various Materia Medicas beginning with the most ancient herbal whose history is as old as the Chinese race itself.

According to Wong and Wu, the *Pen-Ts'ao* or *Materia Medica* has a history as old as that of the Chinese race. It has been reckoned that at different times from that of Shen Nung to the end of the Ch'ing dynasty over 100 special books on this subject have appeared, of which we shall make a brief survey below.

The *Pen-Ts'ao Ching* or Herbal is supposed to be the most ancient treatise on Chinese drugs. Various theories have been advanced as to the date and author of this ancient treatise. The names of Huang Ti, Shen Nung, I Yun, Huai Nan-tzu, Chang Chung-ching, Hua T'o, etc., have been mentioned, but none has been supported by sufficient evidence. The most one can say is that about the time of the Western Han dynasty 206 B.C.-25 A.D. there appeared a medical plant-collection entitled *Pen-Ts'ao Ching* and that probably it was not the work of any one person but a compilation from various authors. Tradition ascribes it to Shen Nung, a legendary emperor who ruled in 2838-2698 B.C. It is a little work of three volumes, containing 365 drugs which are classified under three headings: superior, medium and inferior. This book, however, was not mentioned by the ancient records and its existence was not known until the Han dynasty. In ancient times before the invention of writing the art of medicine was transmitted from one generation to another by oral instruction. When the remedies had multiplied and facilities for recording them had been discovered, the material began to be collected and to appear in book form. And because most of the material was of plant origin it was called the "Pen-Ts'ao" or Herbal.

The *Ts'ai Yao Lu* or *Notes on the Gatherings of Herbs* is a small treatise of two volumes by T'ung Chun, a subject of Huang Ti. It is no longer extant.

In the Liang dynasty 502 A.D. T'ao Hung-ching revised the original *Pen-Ts'ao* and published the book in seven volumes under the title of *Ming I Pieh Lu*. The number of drugs totalled 730, doubling that of Shen Nung's. The additions were taken from famous physicians who lived since Han. Tao Hung-ching submitted the book to Emperor Wu Ti, whose sanction made it the first official pharmacopoeia of China.

Four other works appeared about this time. They are the *Lei Kung Yao Tui*, in two volumes, by Hsu Chih-ts'ai; *Li Shih Yao Lu*, in three volumes, by Li Tang-chih; *Wu Shih Pen-Ts'ao*, in one volume, by Wu P'u, a pupil of Hua T'o, the great surgeon; and the *Lei Kung P'ao Chih Lun*, in three volumes, by Lei Hsiao.

The next important event in the field of materia medica was the publication of the *T'ang Pen-Ts'ao*. Emporer Kao Tsung in 656 A.D. appointed a committee of twenty-two to revise Tao Hung-ching's edition, resulting in the addition of 114 new drugs and extension of the work into 53 volumes. The *Shu Pen-Ts'ao*, or *Materia Medica of Szechwan*, in 20 volumes, was composed by Han Pao-sheng and others who based it on the above, enlarging and adding pictures or diagrams to it. This is the first illustrated book of its kind. Another valuable work was the *Pen-Ts'ao Shih I* by Chen Ts'ang-chi in 10 volumes. It was frequently quoted by later writers. Li Shi-chen mentioned ten other treatises written during the same period but these were mostly obscure and unimportant.

Under the Sungs several Imperial editions of the *Pen-Ts'ao* were published. In 973 A.D. Emperor Tai Tsu appointed nine of the most able medical officials to compile the K'ai Pao Pen-Ts'ao. 133 new drugs were inserted. In 1057 A.D. Jen Tsung ordered the court physicians to make further revisions and compose the *Chia Yu Pu Chu Pen-Ts'ao.* A book of illustrations, *T'u Ching Pen-Ts'ao,* was added later. The pictures were gathered from different provinces by Imperial decree and edited by Su Sung. In 1108 A.D. T'ang Shen-wei, having written the *Cheng Lei Pen Ts'ao,* presented it to Emperor Hui Tsung who changed the title to *Ta Kuan Pen-Ts'ao.* The *Pen-Ts'ao Pieh Shuo, the Pen-Ts'ao Yen I,* and the *Jih Hua Chu Chia Pen-Ts'ao,* were three more productions of this dynasty. They were chiefly commentaries or compilations of previous works.

The Chin and Yuan dynasties enumerate six books on materia medica, which are:—Chang Yuan-su's *Chen Chu Nang,* Li Kao's *Yung Yao Fa Hsiang,* Wang Hao-ku's *T'ang Yeh Pen-Ts'ao,* Wu Jui's *Jih Yung Pen-Ts'ao,* Hu Shih-ko's *Pen-Ts'ao Ko Kuo,* and Chu Chen-heng's *Pen-Ts'ao Yen I Pu I.*

The Ming dynasty is the most glorious in the history of the pharmacopoeia of China. Of minor works that precede the *Great Herbal* mention may be made of the following: *Pen-Ts'ao Fa Hui, Chiu Fang Pen-Ts'ao, Keng Hsin Yu Ts'e, Pen Ts'ao Chi Yao, Shih Wu Pen-Ts'ao, Shih Chien Pen-Ts'ao, Pen-Ts'ao Hui Pien,* and the *Pen-Ts'ao Meng Ch'uang.* But the most important contribution is the *Great Herbal,* generally known as the *Pen-Ts'ao Kang Mu,* fully dealt with in a separate chapter of Wong's book.

Three other works of the same dynasty which deserve notice are the *Shen Nung Pen-Ts'ao Ching Su, Pen-Ts'ao Cheng Ya Pan Chieh,* and *Pen-Ts'ao Shu.* The first is a book of 30 vols. compiled by Miu Hsi-yung. The material is divided into ten classes, namely minerals and stones, grasses, trees, humans, animals, fowls, fishes and worms, fruits, grains and vegetables. The second work was compiled by Lu Chih-i and consists of 10 volumes. The author was the son of Lu Fu, a celebrated doctor of Wan Li's time. At the age of 28 to fulfil his father's dying request, he commenced to write the *Pen-Ts'ao Ch'eng Ya Pan Chieh* which was completed after 18 years of diligent labor. He lost the sight of his right eye after this and when he finished the *Expository of the Golden Chamber* his left eye also became blind. The selection of material for this book was done rather carefully and the identification of plants is fairly accurate. The third *Pen-Ts'ao Shu,* written by Liu Jo-chin, is a compilation of 32 vols. It contains over 480 drugs. The arrangement is entirely different from the *Great Herbal.* Yang Shih-t'ai, published an abridged edition of it entitled *Pen-Ts'ao Shu Kou Hsüan.*

The Ch'ing dynasty is noted for literary research in the classics. Scholars spent most of their time in deciphering the character of absolute words or the meanings of particular phrases. As a result, a revival of the old learning was noticed and a similar influence was felt in materia medica. Three types of writings may be distinguished—the expository, the standard, and the simplified. The *Pen-Ts'ao Ching Su Chih Yao* by Wu Shih-k'ai and the *Pen-Ts'ao Ching Su* by Chou Shu belonged to the first group; the *Pen-Ts'ao Wan Fang Chen Hsin* by Tsai Li-hsien, the *Pen-Ts'ao Kang Mu Shih I* and the Pen-Ts'ao Lei Fang by Nien Hsi-yao, come under the second group; the *Pen-Ts'ao Feng Yüan* by Chang Lu, the *Pen-Ts'ao Pei Yao* by Wang Ang, the *Pen-Ts'ao Tsung Hsin* by Wu I Lo and the *Shen Nung Pen-Ts'ao Ching Pai Tsung Lu* by Hsü Tach'un, constitute the third group. Besides the above, there are still several other works but these are not of much value. On the whole the Ch'ing dynasty did not produce any work of importance on materia medica.

From many of the above sources, and with the critical guidance of Professor Chih Pei Sha of the Department of Oriental Studies at the University of California, the brief summary descriptive of Hsiao Mai, or wheat, appearing in the Pen Ts'ao Ching was found to persist throughout all of the materia medicas studied.

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本草綱目 卷四 五

足太陰脾經手少陰心經。氣味降多於升。陰也。肺主氣。氣平益肺。所以益氣。脾為陰氣之原。脾陰充足。則五藏血脈精髓。周身皮肉筋骨。皆因之強健。自無心煩下洩之事矣。所以止煩止洩也。

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小麥氣微寒。稟天冬寒之水氣。入足少陰腎經。味甘無毒。得地中正之土味。入足太陰脾經。氣味降多於升。陰也。客熱外熱也。小麥味甘而潤。潤則陰生。故煩客熱少陰之絡絡咽。水不制火。則煩渴咽乾。小麥氣寒。則壯水清火。故止煩燥。腎與膀胱為表裏。氣寒益腎。則膀胱熱退而小便利矣。腎水足則生肝木。木滋則氣平。所以食肝氣也。脾統血。血熱則妄行。下漏上吐矣。味甘益脾。氣寒清熱。所以止唾漏也。甘潤益血。女人以血為主。血足所以易孕也。

Reproduction of the beginning section of Hsiao Mai, or wheat, from the most ancient Chinese materia medica, the Pen Ts'ao Ching.

Concerning wheat the Pen Ts'ao states; "it is useful in controlling excessive menstruation." This is to be compared with Shute's recent contribution on wheat germ oil in the treatment of menorrhagia. ([2])

According to the Pen Ts'ao, "wheat promotes fertility in women." Numerous writings have appeared in modern times to credit this action to the vitamin E content of wheat oil. McGonigle ([3]), Young ([4]), Watson ([5]), Watson and Tew ([6]), Cromer ([7]), and more extensively Shute ([8]) through ([16]) have contributed liberally on this subject; from which the conclusion becomes inescapable that the present suspected relation of wheat to human fertility was recognized by the most ancient Chinese therapists, just as they equally clearly described and recognized beri-beri 26 centuries before the Christian era.

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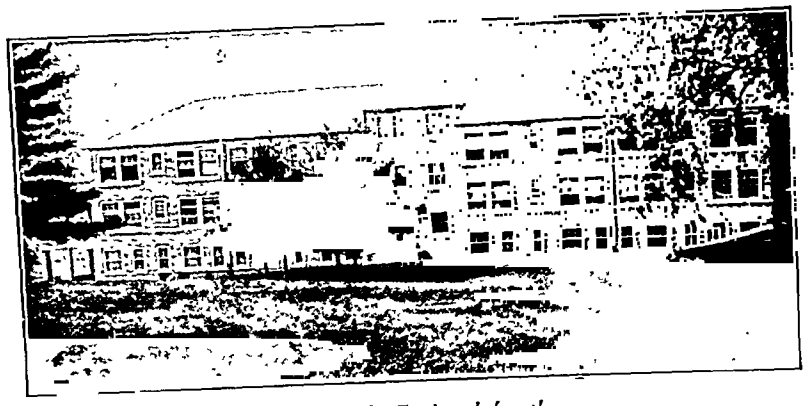
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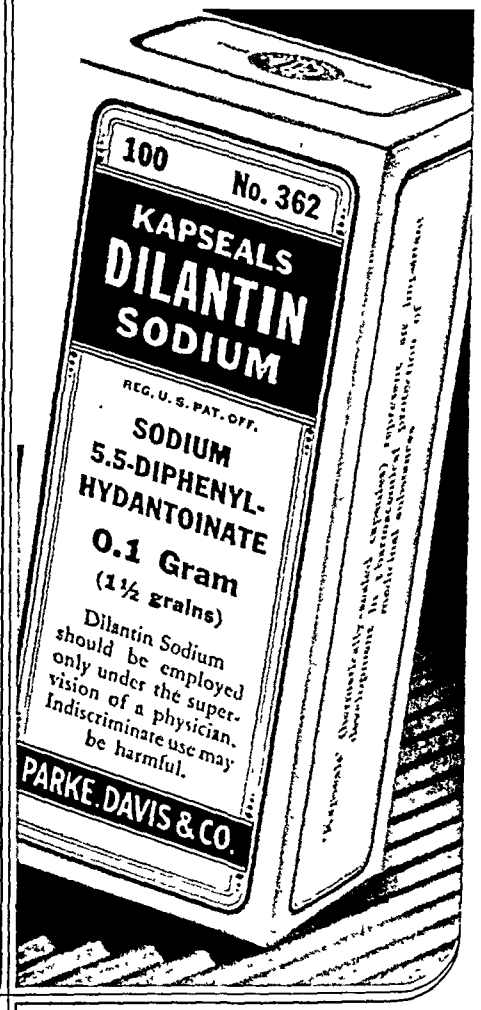
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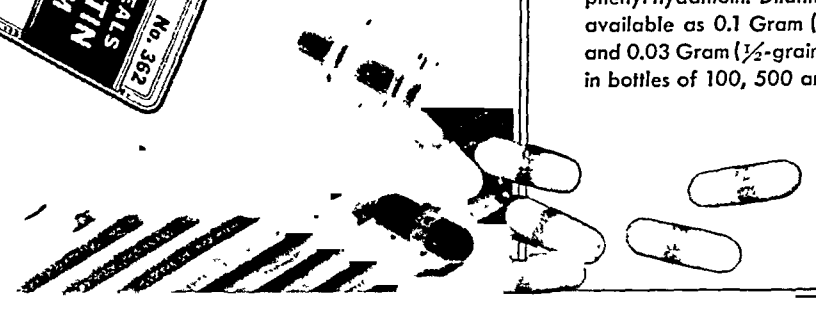
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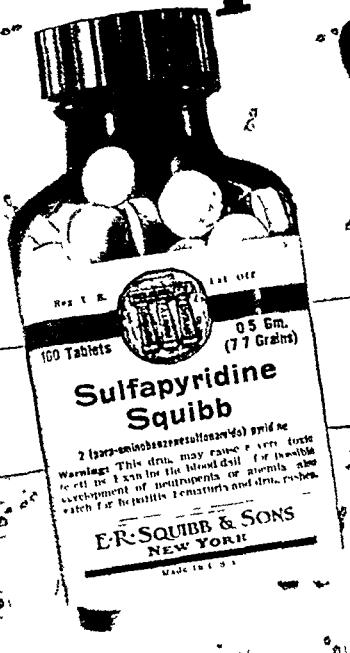
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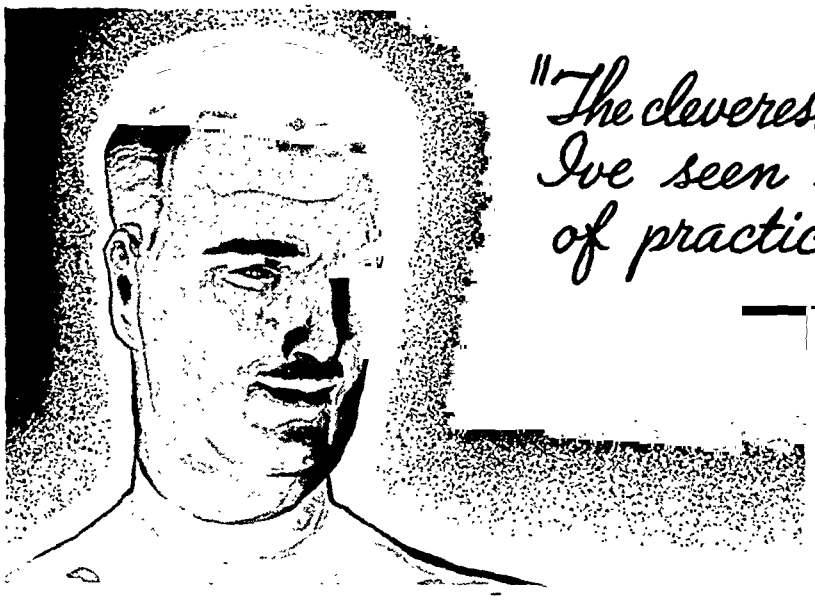
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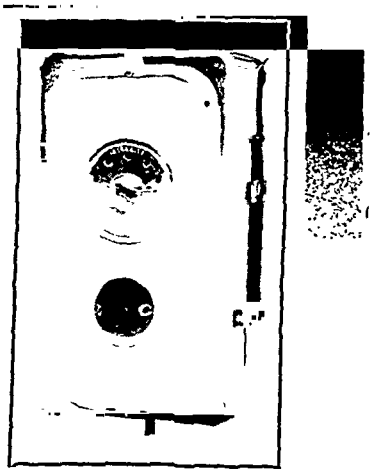
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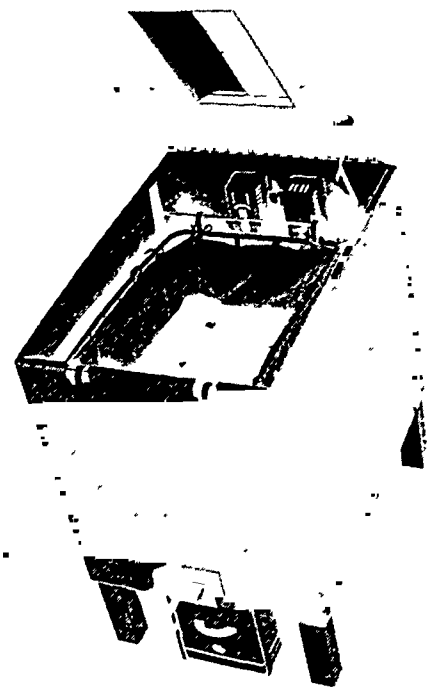
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*Frazer, J. G.: The Golden Bough, vol. 1, New York, Macmillan & Co., 1923



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ADM NUTRITION REVIEWS

VOL. I OCTOBER, 1939 NO. 4

MOTHERHOOD AND WHEAT GERM OIL

In view of the large amount of clinical evidence of the value of wheat germ oil in human nutrition with particular reference to the application of vitamin E in disorders of the reproductive system, a review of the pertinent literature seems appropriate at this time. The remarkable work of Shute on the clinical administration of wheat germ oil to the human female, helps lend much credence to the claims made by earlier investigators to the effect that vitamin E as found in wheat germ oil can be an effective therapeutic agent in reproductive dyscrasias.

By a rather simple test Shute claims to be able to detect avitaminosis-E in either the male, the normal female, or the gravid female. Deficient individuals respond in an amazingly short time to wheat germ oil therapy as shown by this test. Further refinements of the technique and application of the test on a widespread basis will undoubtedly result in developing a routine procedure during pregnancy for the protection of the mother and the unborn child.

VITAMIN E AND REPRODUCTION

In a monograph published in 1927, Evans and Burr [1] very completely outlined the relation of vitamin E to reproduction. They showed that in E-deficient female animals, the processes of estrus, ovulation, fertilization, migration and implantation, occur in a normal manner, but that the fetus dies early in gestation and is eventually resorbed. Such embryos show important changes in the mesenchymal tissues. Male animals deficient in vitamin E eventually become sterile and, later, show testicular atrophy, the onset of which condition occurs later in life than does sterility in the female rat.

Transfer of the essential element to the young through the placenta and the breast milk, with resultant storage of the vitamin, was evidenced by the fact that animals reared from the time of weaning on diets deficient in vitamin E, frequently carried initial pregnancies to a successful conclusion. Later pregnancies in these animals, unless an adequate supply of vitamin E was furnished, resulted in resorption of the fetus. Appropriate assays demonstrated that the vitamin was present in the tissue of normal newborn animals and absent in the offspring of animals on a minimal effective dose of vitamin E. High dosage of vitamin E always conferred a longer fertility period than low dosage in animals previously depleted of the substance. Vitamin E was found fairly well distributed in foods of plant origin and was abundantly present in green leaves, wheat germ, cotton seed oil, cocoanut oil, corn, whole rice and alfalfa. In animal tissues the material seemed to be stored chiefly in the muscles; the content of vitamin E in the viscera and sexual organs was low. The investigators were unable to produce any increase above the normal degree of fertility by the administration of massive doses of vitamin E.

CONFIRMATORY WORK

There was considerable criticism when the early workers assigned a vital part in reproduction to a nutritional element; however, numerous confirmatory articles appeared by various authors from the years 1925 to 1927 and this work has verified the existence and need of vitamin E in animal reproduction. It is interesting to review the additional effects assigned to inadequate vitamin E intake. In 1928, Evans and Burr [2] noted a peculiar paralysis affecting chiefly the hind quarters of young rats suckled by mothers deprived of vitamin E. This paralysis was spastic in type, was never complete and affected only motor nerves, for sensation was intact. Once the paralysis was established, vitamin E did not cure it, but vitamin E given to the young, from the tenth day on, always protected against the occurrence of such paralysis. Many of the deficient animals died; a few recovered spontaneously; others continued to develop apparently in a normal fashion except for the continued presence of the paralysis. A similar type of paralysis, developing in old age in rats on a vitamin E deficient diet was noted by Burr, Brown and Mosely [3] in 1937. These findings were substantiated by many other workers. The pathological findings seem to be chiefly in the muscles [3] [4] [5] and consist of hyaline necrosis of the muscle fibers; and proliferation of the nuclei. Burr, Brown and Mosely [3] stated that microscopic examination indicated pathological changes in the brain and cord in the paralysis which occurred in senile rats. Olcott [5], and others [4], noticed no abnormalities in the nerve, cord or brain. Knowlton and Hines [6] recorded a decrease in the creatinin and an increased chloride content of the gastrocnemius muscle of the rats. The paralysis seems to affect males more frequently than females. A similar disorder has been observed in the guinea pig [7] and rabbit [8] when these animals were maintained on an experimental diet deficient in vitamin E.

Singer [9], in 1936, reported that the thyroid glands of rats deprived of vitamin E were markedly hypoplastic. Barrie [10] [11], in 1937, confirmed this, and reported the presence of enlarged colloid-filled vesicles. However, recent reports published

by Mason and Bryan [12] and by Telford, Emerson and Evans [13] have failed to substantiate Singer's and Barrie's findings.

Daikov and Krizenecky [14], in a study of the relation of vitamin E to the pituitary gland, concluded that the vitamin does not induce sexual maturity as does the pituitary hormone or chorionic gonadotropin. Neither the pituitary hormone nor chorionic gonadotropin, however, could replace the essential function of vitamin E in the reproductive cycle. Rowlands and Singer [15] observed that the pituitary of non-pregnant, E-deficient rats contained about one-half the amount of luteinizing factor found in normal rats; the pituitaries of rats recovered from an E deficiency approached the normal in this respect. These investigators felt that E deficiency resulted in a decreased production of the luteinizing stimulant of the anterior pituitary. Barrie [16], in an histological study of the pituitary glands of E-deficient animals, found degranulation of the acidophils and, to a less extent, the basophils, accompanied by a spongy appearance of the entire gland. She felt the condition of the young E-deficient animals represented dwarfism, and believed that resorption of the fetus is an effect, exhibited through the ovaries, of anterior pituitary lobe deficiency.

Retarded growth in the young nursed by E-deficient mothers, and the early attainment of a plateau in the weight-curve of adult animals maintained on an E-deficient diet, have led to the postulation of a possible lactation-promoting and growth-promoting effect of vitamin E. There is some difference of opinion as to these actions and, at the present time, the clarified picture is not obtainable. Early in the work on this new essential dietary element, it was proposed that vitamin E was essential to the proper function of the hematopoietic system. Later studies failed to substantiate the early claims, but a recent article by Peragallow and Fiori [18] again indicates a possible connection between blood formation and vitamin E.

Barrie [17] has noted a discoloration in the uterus, with a deposition of pigment associated with degeneration of muscle fibers in E-deficient rats; she claims that prolonged deficiency results in fibrosis of the uterine muscle and has observed the development of fibromas in a number of animals. It is interesting to note that Evans [18] in his early studies, noted the formation of deciduomas associated with pseudo-pregnancy in E-deficient animals. Adamstone [19] [20] has described the frequent occurrence of lymphoblastoma in chicks reared upon a diet which was treated with ferric chloride to destroy vitamin E activity. Warren and Butler [21] reported a quick recovery from neurolymphomatosis following the administration of vitamin E, but this observation has been disputed by Cole [22]. Both Pegreffo [23] and Marchesi [24] have reported that vitamin E has a beneficial effect upon the healing of wounds.

CLINICAL OBSERVATIONS

The undeniable existence of a nutritional factor essential for the normal reproductive cycle in certain animal species did not stimulate the amount of clinical interest that followed the discovery of the majority of the vitamins. Encouraging clinical results, however, combined with Shute's [25] observation of the presence of an excessive amount of estrogen-like substance in the blood stream of certain human beings, indicate that vitamin E probably has a more important role in human nutrition than had heretofore been considered even probable.

In 1931, Vogt-Moller [26] reported the use of wheat germ oil in habitual abortion in cattle and, in the same year [27], described two cases of habitual abortion in women, one patient with five previous pregnancies ending in abortion and the other with six previous pregnancies ending in abortion, both of whom when given daily supplements of wheat germ oil throughout, carried pregnancies to term with delivery of healthy normal infants. Since this original report of the use of wheat germ oil in the veterinary field, the oil has been widely used in both small and large animal practice with claimed beneficial therapeutic results by many observers. Vogt-Moller [28] subsequently (1933 and 1936) reported further clinical use of wheat germ oil in a total of 71 women with a history suggestive of habitual abortion, in 54 of whom successful results were obtained. In 1933, Juasz-Schaffer [29] mentioned successful results secured with wheat germ oil in treating five women with a history of habitual abortion. In 1935, McGonigle [30] reported successful results in 16 women given wheat germ oil. Following these early reports, the work of other investigators has lent strong support to the hypothesis that vitamin E deficiency can occur in women and that vitamin E is essential in human reproduction. The 80 cases originally reported by Watson and Tew [31] in 1935 had been extended to 120 by 1937 [32]; in those cases with histories of habitual or threatened abortion, the successful results with wheat germ oil therapy ran between 70 and 80%. However, wheat germ oil

treatment was found unavailing in primary sterility. Currie [33] [34], in 1937, reported his experience with wheat germ oil in 59 cases. From 130 previous pregnancies in 37 of the cases classified as habitual aborters, there had resulted 114 abortions and 16 viable children. None of these patients had had less than two previous pregnancies. Administration of wheat germ oil to these 37 cases during pregnancy resulted in 37 live children; there were two sets of twins, 2 patients aborted during gestation and 4 of the children born, died in the hospital of prematurity. In 15 threatened abortions treated with wheat germ oil, Currie obtained a successful continuation and termination of pregnancy in 14; 1 case developed a vesicular mole. Currie concluded that vitamin E appeared to be the means of combating one of the most difficult problems in the field of obstetrics. He used a dosage of not less than 3 minims of wheat germ oil per day throughout the period of gestation.

In 1937, Young [35], in an article dealing with the habitual abortion and stillbirth syndrome and late pregnancy toxemia, pointed out the similarities of hypovitaminoisis E in the rat and habitual abortion in the human and mentioned the clinical evidence of the value of vitamin E. This investigator suggested that vitamin E was essential for proper nutrition of the placenta and, in some unclassified manner, seemed to be effective through activation of the luteinizing mechanism. In 1938 Cromer [36] reported one failure in the treatment of four habitual abortion cases and three cases of threatened abortion, in which wheat germ oil was administered.

The work of Shute [25] [37] [38] [39] [40] [41] [42] [43] [44] [45] has been particularly interesting; although his reports have been restricted chiefly to the use of wheat germ oil in threatened abortions, he has shown a more logical basis for the clinical application of vitamin E than has heretofore been reported. In threatened abortion and abruptio placentae, he has reported 78% of favorable results. The most unique feature of Shute's work is the demonstration of an antiproteolytic factor of the blood serum which can be reversed by adequate dosage of vitamin E.

Tryptic activity in the blood serum from pregnant animals was clearly demonstrated by Abderhalden [46]. It was advocated as a test for pregnancy but the frequent occurrence of positive reactions in males, non-pregnant females and certain pathological conditions, ruled out the possibility of its being used as a specific test for pregnancy It is interesting to note that Wunderly [47] has observed resistance to proteolysis by certain human blood sera. Shute noticed the uniform occurrence of an antiproteolytic factor in the blood in a high percentage of cases of abruptio placentae and threatened abortion. He has also found that this same antiproteolytic factor appears in the blood serum of male and female rats when vitamin E deficiency has been established. Shute has demonstrated antiproteolytic activity in the blood serum of male students and has observed a higher incidence among the same students in April and May (following the long winter diet) than in November. By adequate dosage of vitamin E, this investigator has been able to show a reversal of the phenomenon in both test animals and the pregnancy cases with which he has worked. Pursuing his investigations further, Shute has shown that the antiproteolytic factor is related to excessive amounts of an estrogen-like substance in the blood. He has shown that, by the addition of estrogenic substance, any normal serum could be made to exhibit the antiproteolytic action. These experiments have been made both in vivo and in vitro. Addition of vitamin E (in the form of wheat germ oil), in the test tube, to blood serum exhibiting this antitryptic activity, either naturally or as the result of adding estrogenic substance, would reverse the antiproteolytic phenomenon. This has led Shute to express the belief that: "Vitamin E in the pregnant woman acts by neutralizing estrogenic substance which, when present in excess, resists the intrusion of the placental villi into the uterine wall [40]."

Two other interesting clinical applications of wheat germ oil have been reported; McGonigle [48], in correspondence to the Illinois Medical Journal in March, 1935, mentioned that he and Smith had used the oil in treating threadworm infestation in children with successful results in a high percentage of cases. Shute [44] has reported 4 cases of atrophic vulvovaginitis, post-menopausal, showing antiproteolytic action of blood sera, which responded to wheat germ oil by mouth

DOSAGE

The absence of an internationally recognized biological unit (there exist two units in use at the present time; the Evans-Burr and the Pacini-Linn units), and the knowledge that wheat germ oils obtained by different methods show variations in vitamin E potency and stability have hindered the establishment of a uniform dose. Pending further research it may be remarked that the empirical

dosage which has been used with excellent results in the human may still be employed with a high percentage of successes. Currie, Watson and Tew have recommended that the 3-minims of wheat germ oil be used at least once or twice a day throughout gestation. Shute has offered his "saturation dose" which consists of supplying massive doses of bulk wheat germ oil varying from 6 to 12 drams with an occasional patient requiring as high as 20 drams. This massive dose is to be given all at once on the first day of treatment and is to be followed by the administration of 2 drams daily for the remaining period of gestation. No harmful effects have been reported from the administration of these huge doses in a series of over 1200 patients.

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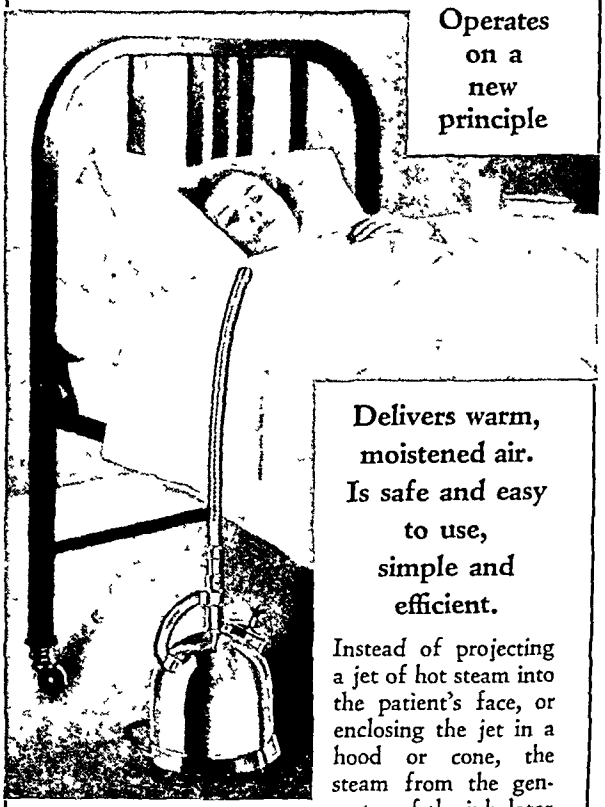
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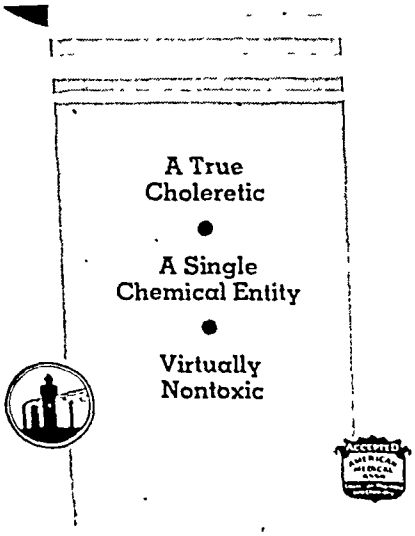
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Maternal Care

An Introduction

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Chicago, Illinois

IT is very gratifying that the JOURNAL-LANCET is devoting an issue to maternal care. It should be very helpful to the readers and be of benefit to their patients because complete maternal care is now recognized by well informed lay and professional groups to be essential for the reduction of maternal, fetal and early infant morbidity and mortality. For about twenty years the American Committee on Maternal Welfare has been urging the medical profession to work both individually and collectively to secure adequate care for all potential and prospective mothers. The Committee believes that adequate maternal care consists of preconceptional, prenatal, intrapartum or delivery, and postpartum care, and of postnatal care for the baby.

Recently this committee has sponsored and produced "The Birth of a Baby" which was designed to be shown publicly with the coöperation of the medical profession of the various states. Its major purpose was to educate mature lay groups relative to the significance and purpose of maternal care and thus help the doctors in securing the coöperation of their patients in giving adequate maternal care. It has been our purpose to stimulate the interest of the doctors in various states and local communities by the formation of committees of the various medical societies. These committees should have a primary interest in the problems surrounding the mothers and their babies. The American Committee has had no set formula for such care but believes that basic principles should be followed though the method of application might vary greatly in different areas. One of the basic principles is education, and this involves both the laity and the profession. These committees should assume leadership in this educational field in their respective areas. They should educate themselves not only to understand the problems of their individual patients but those of their communities. Conclusions should be reached relative to the best solution for the individual and the community.

One very illuminating and valuable method of study is that of case analysis. There have been

†Chairman, The American Committee on Maternal Welfare, Inc.

facilities and organizations set up in many cities and states for study of fatalities of mothers, of fetuses, and newborn infants. Analyses of these cases have been of great educational value not only in improving the care of individual patients but even more important in pointing out inadequacies for proper care of patients in their homes and in hospitals. There is no reason why these case studies should be limited to fatal cases; good results should be as critically studied as the bad ones for much can be learned from both imperfect and perfect management.

Our committee has always believed that medical leadership is vitally essential for the solution of all health problems. The viewpoint of the medical profession must not be limited to private practice and to the individual patient. A larger viewpoint must be taken and the welfare and health of the community must be considered as a medical problem. Health depends upon many factors, and it is important for all physicians to realize that the health of individuals is affected by the health status of the community. The status of health and well being in any community depends upon food, shelter, hygiene and good medical and nursing care. The key to and the index of good health in any community is the type of attention and care given to the mothers and babies of that community.

Maternal Mortality in North Dakota

John H. Moore, M.D., F.A.C.S.†
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THIS report on maternal mortality in North Dakota grew out of a request by the Committee on Maternal and Child Welfare of the North Dakota State Medical Association to the North Dakota State Department of Health for an individual survey of all maternal deaths that occurred in North Dakota during 1937 and 1938. Your Committee on Maternal and Child Welfare, through me as its spokesman, gratefully acknowledges the information obtained by Dr. Williams and her staff. The Registrar of the Bureau of Vital Statistics copied death certificates of all cases in which pregnancy or the puerperal state was mentioned and the physicians who signed these certificates were interviewed personally by a physician from the State Department of Health. From these physicians were obtained the case histories of all the maternal deaths recorded.

All physicians were willing to coöperate and expressed approval of the survey as it was being made. Your Committee expresses its thanks to all the physicians of North Dakota for having made this coöperative effort possible.

When the Committee asked me to report to you on the results of this survey, I agreed upon one condition: The report was to remain anonymous insofar as physicians and places were concerned. This stipulation was rigidly adhered to and in the summaries of case histories and other data to be presented as part of this report that anonymity has been scrupulously maintained. In this way we hope to be able to answer the question, "Why do women die from child-bearing in North Dakota?" And I know that it is your hope that the answer to that question will suggest some measures by which we, as private practitioners, can still further reduce our already low maternal mortality.

From the official records of a special survey made in 1927-1928, we are able to compare maternal deaths by age groups with the state survey of 1937-1938.

TABLE 1

Maternal Deaths by Age Groups, 1927-1928

Age	No. Deaths
Under 20	12
20 to 24	32
24 to 29	34
30 to 39	61
40 and over	31
Total	170

TABLE 2

Maternal Deaths by Age Groups, 1937-1938

Age	No. Deaths
Under 20	2
20 to 24	17
25 to 29	22
30 to 34	19
35 to 39	22
40 and over	8
Total	90

From these two tables it is evident that there has been a sharp reduction in the deaths under the age of 20

†Chairman, committee on maternal and child welfare, North Dakota State Medical Association.

from maternal causes and also those dying from similar causes over the age of 40; while in the group 20 to 24 about half as many died in 1937-1938 as in 1927-1928. But in the intermediate age groups one cannot see any appreciable reduction, based on a comparison of the total maternal deaths for these periods. It would seem, other factors being equal, that pregnancy in the very young and in those approaching the end of the reproductive period may have come to be regarded by the laity as more dangerous and that possibly these two age groups sought medical help earlier. If this is so, our problem is to bring the large, middle groups under medical observation earlier in their pregnancies.

The number of the pregnancy in which the patient died is always of interest as here we can make some comparisons over these two ten year periods.

TABLE 3

Deaths by Number of Pregnancy

Pregnancy	1927	1928	1937	1938
1	22	31	19	15
2	12	8	7	3
3	6	7	5	1
4	7	7	7	1
5	7	6	8	1
6	6	5	3	2
7	4	8	3	1
8	3	4	3	0
9	0	3	2	3
10	4	4	2	0
Over tenth	8	8	2	2

Out of a total of 170 maternal deaths in 1927-1928, 53 or 31 per cent were in primiparous patients; in 90 maternal deaths occurring in 1937-1938, 34 or 37 per cent were in primipatous patients. Either we are not getting the primiparous patient early enough to protect her against the hazards of pregnancy and labor or there are other factors at work which we have not properly evaluated.

The triad, infection, toxemia and hemorrhage, are always listed as the chief causes of maternal deaths and rightly so. In the North Dakota report for 1927-1928, infection killed 32 per cent of the mothers who died; toxemias 27 per cent and hemorrhage 8 per cent of them for a total of 67 per cent of the deaths. In 1937-1938, infection still killed 32 per cent, toxemias 24 per cent and hemorrhage 10 per cent for a total of 66 per cent of the deaths. We can claim a reduction of only 3 per cent in our deaths from toxemia in the comparative percentages for the ten year period. The percentage of deaths from hemorrhage increased by 2 per cent in comparing the two periods.

Since the majority of our maternal deaths in both the 1927-1928 and the 1937-1938 series were classified under this triad, it is important to see if we can trace any factors which may be contributory. In the 1927-1928 series, out of a total of 55 deaths from infection, 23 or 40 per cent of the fatal infections followed abortions; in the 1937-1938 series, out of a total of 29 deaths from infection, 12 of the fatal cases, or again 40 per cent, followed abortion.

In the 1937-1938 series there was a total of 17 deaths from abortion.

TABLE 4

Abortions (including therapeutic)		
Self induced	4	(1 and 3)
Spontaneous	10	(7 and 3)
Therapeutic	3	(0 and 3)

The totals are divided into the respective years, 1937-1938, by the figures in parenthesis following them. The three therapeutic abortions were all performed for hyperemesis gravidarum in 1938. In addition to the twelve deaths from infection following abortion one patient died from influenza-pneumonia and one from secondary anemia. Of the fourteen abortions (not including therapeutic) most of them began at home or in some distant town and were brought to the hospital when in serious condition. There was no definite history of any doctor or mid-wife being in attendance early. The cause, "self-induced" was given only when the patient had admitted it.

There are two very important lessons to be learned just here and if we learn them we can bring about a very substantial reduction in the number of our maternal deaths from infection.

In preparing the following table on prepartum care and maternal deaths, our historian in explaining why only 75 instead of the total of 90 maternal deaths were included stated, "In 1937 six cases were excluded because of death before the fifth month and in 1938 nine cases were excluded because of death before the fifth month." The abortion deaths fall in these excluded groups!

TABLE 5

Prepartum Care and Maternal Deaths.

Amount of Care	No of Deaths	Percentage Having Care
Adequate (3 and 2)	5	6 8
Inadequate (18 and 6)	24	32 8
No care (34 and 12)	46	61.3

Litzenberg, in a timely address on the subject, "What is good care for Mother and Babies"[1] made this statement: "Pre-natal care must begin at once. The idea of having it begin at the third, the fourth, or the fifth month is all wrong. As soon as the woman suspects—even before she knows—that she is pregnant she should consult her physician, and here is the statistical reason: Twenty-five per cent of spontaneous abortions occur before the third month." I recommend this entire address for the careful consideration of all of us but even the limited part of it I have quoted gives us our first important lesson in how to reduce deaths from infection. We must, by every means at our command, succeed in arousing the public to the dangers of abortion and bring the pregnant patient to her physician just as soon as she suspects pregnancy. And it is not the primiparous patient alone, whom we must attempt to reach in order to reduce the death rate from infected abortions. Approximately 80 per cent of these deaths were in multiparous patients with their parity ranging from two to ten and of these, three died in their second and one in her third abortion!

The second lesson we need to learn is one that I have tried to point out before.[2] In the management of an abortion, in progress or incomplete, there is only one safe rule to follow and that is *to regard all such patients as infected* and *avoid surgical interference except for the control of hemorrhage!* Conservative treatment should be our sheet-anchor in the management of them. I regard the following as of basic importance in such a plan of treatment:

1. Put the patient at absolute rest in bed.
2. Control pain.
3. Control bleeding by oxytocic drugs if possible; if not, by vaginal tamponade.
4. Combat shock.
5. Have blood examination made.
6. Give supportive treatment when necessary.
   a. 5 per cent dextrose in saline by phleboclysis.
   b. solution of gum acacia.
   c. blood transfusion.

Under this plan of treatment, the majority of the patients will complete their abortions spontaneously with a minimum amount of damage to themselves. But, if under such conservative management, evidence of infection increases, the following additional procedures are recommended:

1. Elevate the head of the bed on blocks.
2. Apply ice bags to the lower abdomen.
3. Continue supportive treatment.
4. Employ Elliott treatment.
5. Consider the use of sulfanilamide.
6. Combat anemia with small, frequent blood transfusions.
7. Invade the uterus only for the control of hemorrhage. and then
8. *Do not curette!*

Two brief case histories from our 1937 series will forcefully illustrate the two lessons I mentioned earlier:

Case No. 18. February 20: Had miscarriage of two months at home. Was up and about doing her housework but felt badly. March 20: Entered hospital. Chief complaints were pain, tenderness of lower abdomen, slight vaginal bleeding. Temperature, 102.4 F; pulse 120. Patient acutely ill. March 22: Pelvic examination revealed tenderness, induration, fluctuation and fulness in pelvic cavity. March 26: Death. Autopsy revealed "Much diffuse peritonitis, much pus accumulated in the flanks and in the pelvis. Spleen enlarged to twice its normal size. Plum butter appearance of a toxic spleen. Uterine cavity contained small amount of placental tissue."

Here was a patient who did not give her physician a chance to do anything for her for *one month after* the onset of the illness which was to prove fatal. Surely this patient presents an extreme example of the need for lay education as to the danger of abortion.

Case No. 23. This patient was admitted to the hospital "showing effect of loss of blood and very ill." She had expelled a three months fetus fourteen days previously and the placenta the day before entering the hospital. She had had a great loss of blood but a curettage was done in the hospital on the day she entered and upon admission her hemoglobin had been recorded as 45 per cent and her erythrocytes as 2,610,000. Two weeks later she was discharged from the hospital although the blood picture remained the same. Five days after leaving the hospital she was brought back. Her hemoglobin was 40 per cent, erythrocytes 2,880,000 and leucocytes 15,000. She died nine hours after her second admission.

This patient, likewise, had had no prepartum care but surely, during her two weeks in the hospital, there must have been time for an intensive campaign of conservative, supportive therapy!

Seventeen cases of puerperal infection remain to be classified in our deaths from infection in the 1937-1938 series. As to prepartum care, they revealed the following:

TABLE 6

Prepartum Care		
Prepartum care:		
Adequate	0	
Inadequate	3	(3 and 0)
No care	14	(10 and 4)
Developed in hospital	8	(7 and 1)
Developed in home	9	(6 and 3)

It is encouraging to note, even in this small series, that the numbers in parenthesis to the right indicate an improvement in 1938 over 1937. It is also noteworthy that in not one of the deaths from puerperal sepsis during this two year period had any of the seventeen patients had adequate prepartum care.

Unfortunately, we have not enough data to analyze the nine deaths from sepsis following deliveries in the home but for the eight deaths from sepsis which followed hospital deliveries we find the following: Two patients had normal deliveries. Three of the remaining six had high forceps deliveries, two had versions and extractions, one died from an infected episiotomy wound although the delivery had been spontaneous and one patient died following a curettage done by a visiting physician on the twentieth day postpartum. Her delivery had been normal. The three deaths from sepsis following high forceps operation all occurred in 1937.

Case 19. Death certificate: Puerperal sepsis. Terminal: peritonitis. Prepartum care: Last four months. The Doctor stated that her condition seemed good. No records were available to our historian. Labor was long and hard, due to a moderately contracted pelvis and a large baby. High forceps were used. The mother's temperature rose on the third day after delivery and the patient ran a septic course until the seventh postoperative day and death.

Case 35. Death certificate: Exhaustion, postpartum hemorrhage and septicemia. "Brought to me after four days in labor." Face presentation. Prepartum care: None. I quote from the second physician's record, given to our historian by him: "Prolapse of cord four days. High forceps. Stillborn. Dead for unknown length of time. Macerated. Vulva and perineum greatly swollen. Temperature 103 F, pulse 136 on admission. Temperature 104 F, pulse 144 on second day. Temperature 105 F, pulse 160 on fourth and last day. Hemorrhage scanty in hospital but apparently marked previously. Forceps had been previously applied."

Case 19 evidently represents a cephalo-pelvic disproportion which was overlooked in a primiparous patient. That there had been time to determine this is evidenced by the fact that she had had prepartum care for the last four months.

Case No. 35 illustrates the "dangerous multipara" in one of her most dangerous moods, a neglected face presentation! This case originated in the home and terminated in the hospital. It is one of the reasons why

hospital mortalities in obstetrics are likely to run higher than an equal number of deliveries in the home. The hospital so often gets the complicated cases! Had the first physician who treated this patient recognized the pathology present early enough, the second physician would probably not have had to sign a death certificate for a patient with puerperal sepsis. High forceps operation, whether it be performed on the primiparous or the multiparous patient, is one of the most difficult and dangerous operations in the entire field of obstetrics, difficult from a mechanical standpoint and dangerous from the ever-present dangers of trauma with the resultant hemorrhage and sepsis.

Case No. 52 represents the third death from sepsis following high forceps operation. The hospital in which this death occurred had no records except the nurse's daily report! Here is a case where there was not the slightest evidence presented to warrant the performance of one of the most dangerous operations in obstetrics—high forceps. The reflection is on the hospital as well as on the physician. Here is an institution, admitting maternity patients and without any record system except the nurses' daily reports. It is to be hoped that such haphazard methods will be speedily corrected in the interest of patients, physicians and hospital!

In leaving this analysis of the hospital deaths from sepsis, only two of the eight deaths followed strictly normal labors. Both of these normal labors had intercurrent infections at the time of delivery. That leaves six deaths that followed operative procedures varying from episiotomy to high forceps operations, an operative incidence in the hospital cases of 75 per cent. We do not know the incidence of operative procedures in the nine cases where sepsis developed in the home, except in the occasional instance, but we do know the hospitalization record for the entire group of 90 deaths which occurred in 1937-1938. These are given in the next table and, again, the figures to the right in parenthesis give, respectively, the "break-down" for 1937 and 1938.

TABLE 7

Hospitalization for Entire Group	Cases	
Hospitalized before complications set in	20	(14 and 6)
Hospitalized after complications set in	51	(31 and 20)
Not hospitalized	19	(16 and 3)

It would appear from this table that approximately the same number of our fatal cases for this two year period were not hospitalized at all as compared with the number of patients who were hospitalized before complications arose. That leaves the large, middle group of 51 patients or 56 per cent of our total deaths who, for the most part, presented greatly increased obstetric risks when they entered our hospitals.

My impression, gained from a study of these 51 patients and the circumstances under which they died is that the need is for:

1. More adequately staffed and supervised maternity departments.
2. More consultations among the physicians doing obstetrics, especially in the matter of deciding upon the wisdom of a proposed obstetric operation.
3. More adequate equipment to meet the obstetric emergency.
4. More careful and complete records of the maternity patient.

In the two year period, 1937-1938, there were twenty-two deaths from the toxemias of late pregnancy in North Dakota. This group comprises 24 per cent of our total deaths and is second in the triad. It is 3 per cent less than in 1927-1928. Several tables will illustrate what happened in this group:

TABLE 8—Prepartum Care

Patients with Toxemia of Late Pregnancy.		
Adequate	2	(1 and 1)
Inadequate	9	(4 and 5)
None	11	(8 and 3)
Total	22	

TABLE 9

Delivery		
Normal	6	(5 and 1)
Operative	13	(6 and 7)
None	3	(2 and 1)
Total	22	

TABLE 10

Births		
Live births	14	(9 and 5)
Stillbirths	6	(4 and 2)—twins
No birth	3	(2 and 1)
Total	23	

TABLE 11

Operative Deliveries in Fatal Toxemias		
Cesarean section	2	(1 and 1)
Forceps deliveries	9	(4 and 5)
Not stated	2	
Total	13	

The first of the deaths from toxemia following cesarean section revealed the following:

Case No 4. Prepartum care: Given by a doctor during the last three months This patient entered the hospital with no record of any complaints She was not in labor. Measurements were recorded as "no disproportion" Urinalysis and blood pressure normal Cesarean section was performed on the day of admittance to the hospital No reason for it was recorded. The patient died on the twenty-first postoperative day.

One would find great difficulty in justifying cesarean section in this patient. To me it represents an operative furor, wholly unjustified, and with the doctor's own record to condemn such a radical procedure.

Case No 27. Prepartum care: None. The patient developed edema, headache and epigastric pain at the seventh month of pregnancy She was admitted to the hospital with a blood pressure of 236/110. Albumin 4 plus No convulsions. Glucose solution was given intravenously Three days later convulsions began and induction of labor was done. The following day she was delivered of a stillbirth by cesarean section and died during the operation.

An eclamptic patient is in shock or on the borderline of it. To subject such a patient to the risk of a major

surgical procedure is neither good obstetrics nor good surgery. Probably this patient would be classified as a nephritic type of toxemia with hypertension. She was a desperate risk to begin with but the pregnancy was only at the seventh month and a medical induction of labor had been done. Why add the final shock of a cesarean section?

Another type of dangerous operative interference is illustrated by the following case history:

Case No. 5. Patient admitted to the hospital at 6:20 P. M. She had had regular prepartum care and her condition was apparently good. She walked in complaining of sleeplessness. Temperature, pulse and respiration normal. Blood pressure not recorded. The following day she had a severe headache and aspirin was given. At 11:30 P. M. she had her first convulsion. She was given calcium gluconate, bromides, caffeine sodiobenzoate and chloroform. The next morning at 2:00 A. M., Pituitrin M.5 was given and the membranes were ruptured artificially. Magnesium sulphate 25 per cent and glucose 50 per cent were given intravenously at 4:00 A. M. There was slight dilatation of the cervix. Pituitrin M.10 was given. Convulsions occurred every few minutes.

Bimanual dilatation of the cervix was done and a stillborn infant delivered by high forceps operation at 8:45 A. M. The placenta was normal. First degree lacerations were repaired.

The temperature was recorded as 98 on the day of admission. No further record of it was found until three days later at 10:30 P. M. when it was 102.4. It remained above 100 until three days later when it was 104. It continued between 103.2 and 105 until death. There was no written order, no temperature chart, no laboratory report and no blood pressure reading on the hospital chart.

Here is an example of "accouchement force" applied to a toxic patient with the all-too-frequent fatal result. Other histories could be cited to throw grave doubt on the wisdom of forceful interference in patients suffering from the severe toxemias of late pregnancy; but it is only necessary to point out what a previous chart has shown; that in the 22 patients who died of toxemia, 13 or over 50 per cent, had some type of operative delivery whereas six or only 27 per cent died following normal delivery.

As I have pointed out, we have reduced our deaths from the toxemias of late pregnancy 3 per cent in ten years. If there is to be any further reduction in deaths from this type of obstetric complication, it will come through an earlier recognition of them and a more conservative management. Prevention means prepartum care early, regularly and faithfully, and it means a campaign by organized medicine through the individual physician to get the women of our state familiar with the criteria of adequate prepartum care.

As to active treatment, I cannot refrain quoting from Mengert.[3] Speaking of a patient presenting toxemia with convulsions, he stated to us in his course last year: "However, to deliver such a patient immediately is inviting disaster, because she is in no condition for any type of strenuous therapy. Delivery of the eclamptic woman before full dilatation of the cervix represents radicalism. In a series of more than five thousand eclamptics, the maternal mortality rate of patients treated by radical means varied between 20 and 25 per cent. In a similar series of five thousand eclamptics treated conservatively, the maternal mortality rate was only 10 to 12 per cent. In other words, to deliver the eclamptic by whatever means before full dilatation of the cervix doubles her chances of dying. Holland (British Isles), in a review of treatment of eclampsia in England, found that manual dilatation (or laceration) of the cervix as a treatment for eclampsia gave the highest maternal mortality rate. Cesarean section was the next worst method of treating the eclamptic."

Summing up the treatment of the severely toxic or convulsive patient, my own experience has taught me that the best results are to be obtained by:

1. Employing conservative methods of treatment. We prefer a modified Stroganoff treatment without the chloroform but with adequate sedation. While this is being carried out, hypertonic dextrose solutions are given by phleboclysis and the fluid intake and the urine output are carefully checked for adequacy.
2. When the maximum improvement has been attained we prefer to induce labor, if necessary, by mechanical rupture of the membranes.
3. When the cervix has fully dilated, we deliver by midplane or low forceps if the head is well down in the pelvis. High forceps are not used. In the event that the head is at the inlet or above, version is our operation of choice.

Ten per cent of our maternal deaths for 1937-1938 are directly charged to hemorrhage, the third member of the fatal triad. Three of the nine deaths from hemorrhage were due to placenta previa; the remaining deaths, five in 1937 and only one in 1938, occurred from the period immediately after labor to as long as 27 days following delivery.

Two of the deaths from placenta previa are interesting and instructive:

Case No. 1. Prepartum care: None. On December 26, 1936, the patient was carried into the hospital and a doctor was called. Her husband stated that the patient had a hemorrhage the first week in December and continued to have some bleeding until December 26, when she had a sudden severe hemorrhage which sent her to the hospital.

The patient was examined and attended by a physician through December 26, 27, 28, 29, 30, 31. She continued to bleed. Pulse 104 to 112. She was given calcium lactate, lextron and morphine.

On January 1, 1937, labor began at 3:30 A. M. Pituitrin ½ cc. was given at intervals for six doses. The membranes were ruptured artificially at 6:30 P. M. and the baby was stillborn at 6:58 P. M. The placenta was expelled at 7:15 P. M. and death occurred at 8:50 P. M.

This is a typical history of a neglected case of placenta previa. For a period of weeks this patient bled daily at home and bleeding continued for six days *after* she was admitted to the hospital. There is no record of blood counts or hemoglobin determinations, no record of any direct attempt having been made to stop the bleeding and no record of blood transfusion or any other supportive intravenous fluids having been given.

Case No. 37. Prepartum care: None. When at term, this patient had a severe hemorrhage at home. There is no history of the hemorrhage having been associated with pain. She was taken 20 miles to the hospital, delivered spontaneously and died two hours later.

If this was a case of placenta previa, it, fortunately, represents the unusual type. It is rare for the first hemorrhage in placenta previa to be as severe as this one.

The 20 mile trip to the hospital was doubtless a debilitating factor. One wonders if there was time for intravenous fluids to have been employed; certainly it would tax the facilities of the hospital to have had blood donors available on such short notice.

In all of the deaths from hemorrhage one fact stands out: No attempt was apparent in any case to supply the fluid lost!

We all recognize obstetric hemorrhages as dramatic events which are likely to occur when we are least ready to combat them. But there is no longer any need for us to remain totally unprepared for such emergencies. Flasks of 5 per cent dextrose in normal saline, normal saline solution and 6 per cent solutions of gum acacia are now so readily available, sterilized and portable, that every hospital admitting maternity patients should be required to have them instantly available. From personal experience, I can recall several cases of obstetric hemorrhage that have been tided over the critical period until a suitable blood donor was available by the use of a 6 per cent solution of gum acacia by phleboclysis. Nor does the administration of any of these solutions need to remain a hospital procedure. An intravenous outfit with tubing and needles properly sterilized and the solutions in sterile flasks as prepared by the manufacturers are now so readily available and so portable that they ought to be part of the regular armamentarium of every physician practicing obstetrics in home or hospital. Particularly is the need for them likely to arise in the case of the physician attending an obstetric patient far from a hospital. He can, if so equipped, meet the dramatic emergency of a sudden hemorrhage at the patient's bed-side, in her own home, without waiting for distant help which, if it arrives at all, most often arrives too late.

In the list of maternal deaths for 1937-1938 there are thirty, or one-third of the total number, classified under miscellaneous headings.

Under "Accidents of childbirth," our historian has classified ten cases—two in 1937 and eight in 1938.

One case history will illustrate one type of patient we may all see at any time and in whose presence, even with modern therapy, we are so often helpless.

Case No 3. Prepartum care: Eight months. The patient had a normal pregnancy until one week before delivery when she became ill with influenza and entered the hospital. Twenty-four hours before delivery she developed lobar pneumonia, was typed and serum was given Labor began normally and lasted one hour Quick, easy birth was by breech presentation The patient was cyanotic and was not removed from her room for delivery Death occurred twenty-four hours after delivery.

This patient and five others in whom pneumonia complicated pregnancy at various stages of gestation illustrate what has so often been said about the dangers of respiratory infections complicating pregnancy.

Two deaths following cesarean section are also included in this group. In one case death was due to post-operative shock and cardio-respiratory failure in a primiparous patient with post-infantile paralysis of the accessory muscles of respiration. Her pelvis was so badly deformed that measurements were impossible. The second death following cesarean section occurred in a multiparous patient who was sectioned approximately one week after induction of labor had been attempted by various means, including artificial rupture of the membranes. The wound became infected three days after the operation and approximately ten days later the patient suddenly died.

A patient with a typical case of decompensated mitral stenosis died undelivered and the complication in the final case in this list of "Accidents of childbirth" was proven by autopsy to be "a gangrenous section, measuring about 20 inches, of large intestine." This was dilated and suggested a previous megacolon. Delivery had been accomplished elsewhere and the patient was admitted to the hospital in extremis.

Under the heading "Other toxemias" are listed seven deaths, three of pregnancy or puerperal psychosis and four cases of hyperemesis gravidarum. They died at various stages of pregnancy or the puerperium.

A review of the four case histories of the patients dying from hyperemesis gravidarum reveals an identical sequence of events in three:

1. A background of nervous instability.
2. A thorough trial of the commonly accepted treatment for the vomiting of pregnancy including diet, sedation, hypodermoclysis, phleboclysis and, in two instances, blood transfusions.
3. Therapeutic abortion in three cases, 15 to 30 days after treatment was first instituted.
4. All three died from 21 to 23 days after therapeutic abortion with terminal hyperpyrexia.

The fourth case and the only multiparous patient in the series (para 8) vomited from early pregnancy until her death at the fifth month. She had prepartum care including one month hospital treatment from the beginning of the fourth month and she died undelivered.

This is not the place for a discussion of the management of cases of hyperemesis gravidarum but it is pertinent to add this thought: Every patient suffering from the so-called "normal" nausea and vomiting of pregnancy is a potential candidate for hyperemesis gravidarum. While there is no doubt but what there is a large neurotic background in the vast majority of these patients, it is a grave mistake to dismiss them with that explanation. In spite of our best therapy, a certain percentage of these patients will develop symptoms of a toxic nature, chiefly polyneuritic, and it requires a nice discrimination to know when a therapeutic abortion should be performed.

In the deaths from psychosis, all were multiparous patients: All had insomnia as the chief prodromal symptom. Two of them died one month and one week, respectively, following labor; the third during the fourth month of pregnancy. In the two cases that died following delivery there had been no prepartum care. The patient who died in the fourth month of pregnancy started as a case of toxic vomiting but during the six weeks of her hospitalization she developed a violent mania. When a pregnant patient begins to complain of insomnia, it is time to investigate her carefully from a mental standpoint if we have not done so earlier and, in the puerperium, I have noted that insomnia is the

cardinal symptom noted in patients who subsequently develop insanity.

Seven patients are classified under the heading "Embolism and sudden death." A review of the histories substantiates such a diagnosis in each case. Four of them followed normal deliveries. One occurred a few minutes after an unattended delivery and two followed abortions. I know of no way in which we can predict such a dramatic accident.

The last group comprises six deaths from ruptured ectopic pregnancies. Two of them died unattended but the diagnosis was established by the aspiration of blood from the abdominal cavities and in the other four it was confirmed by laparotomy or autopsy. I fail to find any instances where one of them could have been saved by any means available to the attending physicians. However, these deaths teach us the importance of careful history taking. In this connection I would especially call your attention to the splendid article by Schoregge[4] in the February 1939 issue of the JOURNAL-LANCET in which he reviews 166 cases of ectopic pregnancy treated in the Quain and Ramstad Clinic. Here is practical advice that will prove helpful in meeting this major disaster of early pregnancy.

One of the most striking things noted in going over the statistical data on our maternal deaths was the apparent relationship between maternal mortality and the degree of prepartum care. Fully 94 per cent of the women who died in this two year period had inadequate prepartum care or none at all.

Your Committee on Maternal and Child Welfare in January, 1938, endorsed the principles of antepartum, intrapartum and postpartum care as contained in the booklet, *Maternal Care,* edited by Dr. Fred L. Adair. We recommended to the North Dakota State Department of Health that this booklet be distributed as far as funds would permit to physicians practicing obstetrics in North Dakota. This has been done.

Birth rates are always of vital concern. The next chart shows the birth rate per 1000 population from 1930 to 1938, inclusive. You will note that over this nine year period it has declined 3.31 per thousand. In the nine year period, 1930 to 1938, inclusive, our stillbirth rate per 100 live births has fallen 0.7 of one per cent and most of this small drop has occurred in the past three years.

TABLE 12—Births
(Rates per 1,000 Population)

Year	Births	Rate
1930	14,639	21.50
1931	14,232	20.79
1932	13,858	20.15
1933	13,324	19.28
1934	14,613	21.04
1935	13,819	19.80
1936	13,770	19.67
1937	13,005	18.43
1938	12,880	18.19*

*Provisional.

TABLE 13—Stillbirths
(Rates per 100 Live Births)

Year	Stillbirth	Rate
1930	407	2.8
1931	409	2.9
1932	390	2.8
1933	341	2.6
1934	352	2.4
1935	352	2.5
1936	370	2.6
1937	308	2.4
1938	274	2.1*

*Provisional.

In any study of maternal mortality, the infant mortality rate is of vital economic importance. With a falling birth rate, a rate in our own state which is dangerously near that necessary to maintain a stable population, the chief answer to the falling birth rate, from a medical standpoint is better maternal care through all stages, pregnancy, labor and the puerperium.

I am gratified at being able to show you this next chart for it shows the maternal death rate for North Dakota per 1000 live births from 1930 to 1938, inclusive. I am sure that we all feel proud of the rate of 2.25 for 1938, by far the lowest on record. The problem of maintaining this low rate or even of lowering it still further is our problem as private practitioners.

TABLE 14—Maternal Deaths
(Rates per 1,000 Live Births)

Year	Deaths	Rate
1930	90	6.14
1931	69	4.82
1932	71	5.12
1933	68	5.10
1934	70	4.79
1935	71	5.21
1936	60	4.36
1937	61	4.69
1938	29	2.25*

*Provisional.

I believe that the private physician in North Dakota is assuming the leadership in maternal care that is rightfully his and the response that the physicians of this state have given our Committee on Maternal and Child Welfare in its attempts to further your educational program is most heartening.

If I could leave any one thought with you to the exclusion of all others it would be this: 61 per cent of the maternal deaths in North Dakota during 1937-1938, exclusive of the deaths from abortion, occurred in women who had no prepartum care; 66 per cent of the maternal deaths for the same period, including abortions, were due to the triad, infections, toxemias and hemorrhage. We have sufficient knowledge to prevent the majority of these deaths. But to prevent them we must get the patient early enough to apply that knowledge. In this fact alone lies our greatest challenge—and our greatest opportunity.

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Postgraduate Education in North Dakota

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As in many other states, postgraduate medical education in North Dakota has been largely confined to obstetrics and pediatrics. This is not because physicians are especially deficient in these branches of medicine but because there is now an especially great interest in the welfare of the mother and the infant. That is as it should be if we are to continue to lower the maternal and infant death rates.

Component district societies, of course, provide programs with outstanding speakers for their respective groups and frequently these deal with obstetrics and pediatric subjects. However, this discussion has to do only with organized effort to supply the medical profession of the whole state. All of these endeavors have been carried out by the Committee on Maternal and Child Welfare of the North Dakota State Medical Association in coöperation with the State Department of Health. The chairman of this committee, Dr. John H. Moore of Grand Forks, and the State Health Officer, Dr. Maysil Williams of Bismarck, have been and are very interested in doing everything which lies within their power to provide the most complete information and facilities for the doctors of the state in order that the profession may have no obstacles to the rendering of the best possible service to the people of the state. Both of these doctors have upon various occasions stated that they believe that North Dakota is blessed with a very high type of medical practitioner.

The first attempt at postgraduate medical education was made in 1936 when Dr. John Urner of Minneapolis was brought to the state by the committee and the State Department of Health. He lectured at five towns in the state and was worked very hard, giving a talk in the afternoon, in the evening and again the next forenoon. These meetings were very well received by the doctors of the state. Especially did they appreciate the willingness of Dr. Urner to talk with them after the formal meeting about their particular problems. This is an especially important feature of postgraduate courses and time should always be provided for it. In this way the men have an opportunity to discuss cases which have given them some concern with a man who they feel can give them sound advice.

Nothing more was done with postgraduate courses until at a meeting of the committee held in Bismarck January 29, 1938, Dr. Ralph Pray of Fargo was appointed chairman and the writer the other member of a subcommittee to arrange for a postgraduate course in the fall of 1938. Dr. William F. Mengert of the University of Iowa and Dr. Willis H. Thompson of the University of Minnesota were brought to the state for two weeks, the former to lecture on obstetric subjects and the latter on pediatrics. Meetings were held at Bismarck on October 17 and 24, at Dickinson on October 18 and 25, at Minot on October 19 and 26, at Grand Forks on October 20 and 27, and at Fargo on October 21 and 28. At each place the lecture on obstetrics was held at four o'clock and that on pediatrics at 8 o'clock. The meetings were held at these points because the subcommittee felt that these towns, because of location and size, were best suited to supply opportunity for the largest number of physicians to attend the courses with the fewest miles travelled. The time of the meetings was so selected because it was believed that it would require the least time away from the physician's office. Two hundred and sixty physicians attended the courses and that number is more than half of all the doctors in the state. We believe that that is a good attendance. After the meetings were over, Dr. August C. Orr of the State Health Department sent questionnaires to all those who had registered to find out whether or not the kind of course which had been given was appealing to those who came. With one exception all who replied—and more than half returned the questionnaires—were enthusiastic in their comments regarding the courses as held last fall. Many came long distances to attend—one physician came more than 160 miles.

Information regarding the courses was made available to the doctors through the press and by a circular letter sent out by the State Department of Health about one month before the first meeting. A little later a letter containing a return postcard for advance registration was sent to each physician in the state. After the courses were over, the booklet "Maternal Care" approved by the American Committee on Maternal Care and edited by Dr. Fred L. Adair of the Chicago Lying-In Hospital was sent to the physicians of the state following the recommendation and endorsement of the State Committee on Maternal and Child Welfare. It is the belief of the committee that the profession of the state was interested and satisfied by these courses as conducted in the past year. The committee hopes and believes that it will be able to arrange a series as acceptable for the fall of 1939. By the time this is in print each physician will have received information about the places and dates of this year's meetings.

The Committee, through its chairman, Dr. Moore, was able with the coöperation of the State Health Department to inaugurate a program designed to lower the mortality of the premature infant. Through the efforts of the committee, incubators of good quality have been installed in more than twenty hospitals of the state. Another phase of the program was the sending of Dr. Ralph Pray of Fargo to many of the cities and towns of the state to discuss the problem of the care of the premature with the laity, the nurses and the physicians. In

most of the localities three meetings were held, one for each of the three groups mentioned. While no registration of the laity attending was made, the number at each meeting was good. A total of 594 nurses attended lectures held for them. Each component medical society held a meeting at which Dr. Pray was the principal speaker for that occasion.

In May 1939 funds were made available by Dr. Williams of the State Department of Health for the purpose of sending ten physicians to attend the course in obstetrics held at The Center for Continuation Study at the University of Minnesota. The registration fee, traveling and living expenses were paid from these funds. When they returned, they were enthusiastic about the course which they had just attended. North Dakota may take some pride in the fact that more physicians have registered from this state for the medical courses at the Center for Continuation Study than from any other state including Minnesota.

The manner of selecting ten men was left to the district societies—one from each district. That the physicians were anxious to have the opportunity is evidenced by the fact that each district had from eight to ten applicants. The successful one was drawn by lot from the list.

In the fall of 1939, Dr. Russell J. Moe of Duluth will be the lecturer in obstetrics and Dr. A. V. Stoesser of Minneapolis will present pediatric subjects. It is hoped that towns and dates may be selected so that even more than attended last year will be able to register this year.

All funds for the expenses for the above courses have been made available by Dr. Williams of the State Health Department from funds which she has on hand. No registration fee has ever been charged those attending the meetings although there may come a time when this will be necessary.

The Toxemias of Late Pregnancy*

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ALTHOUGH recent years have shown a definite decrease in maternal mortality due in part at least to a steady decline in the number of deaths from toxemia, this condition still constitutes one of the major causes of maternal mortality. Furthermore, as recently pointed out by Miller[1] immediate mortality does not tell the whole story since many women show a remote morbidity and mortality as a result of toxemia during pregnancy. Peckham[2] also reports that prolonged follow-up study of toxemic patients demonstrates that one-third of them will be left with chronic vascular disease. The fact that our knowledge of the etiology of toxemias has not changed materially in recent years does not seem to make improvement in the control of the condition impossible, as evidenced by recent progress. The improvement seems to be in the use of various empirical methods for control of symptoms and when these fail, interruption of the pregnancy early enough to avoid serious permanent damage.

Since all of the toxemias of late pregnancy have certain characteristics in common, namely edema, hypertension and albuminuria, and since their exact differential diagnosis is dependent in many cases upon elaborate investigation and follow-up it seems that for practical purposes of prophylaxis and treatment they can be grouped into three main groups: (1) Essential hypertension, or chronic hypertensive vascular disease, (2) Acute and chronic nephritis, (3) Pre-eclampsia and eclampsia.

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ESSENTIAL HYPERTENSION

Patients who present evidence of mild chronic hypertensive vascular disease before or early in pregnancy without evidence of impaired renal function frequently show an exacerbation of the condition as pregnancy advances. This may occur at any stage of pregnancy but frequently takes place in the later months.

The usual picture is that of a mild elevation in blood pressure with a systolic reading from 130 to 160 mm. and diastolic of 90 to 120 mm. As a rule, in the early stages, the patient has no complaints and there is usually an absence of edema and albuminuria. As the pregnancy advances there is likely to be an increase in the hypertension which may reach over 200 mm. systolic with a proportionate rise in diastolic pressure. As the disease progresses, we may see mild albuminuria also but rarely is it a remarkable feature. Edema likewise is usually absent even in advanced stages. This condition differs from the pre-eclamptic and nephritic group in

that water retention and proteinuria are absent or minimal. These patients may go on to full term and deliver without serious complications but many of them have a premature delivery following fetal death which results from extensive placental infarctions. As a rule the blood pressure reduces somewhat following delivery but rarely does it return to normal or to the level that it was before pregnancy.

Nephritis

Strictly speaking nephritis complicating pregnancy should not be considered as a toxemia but since the signs and symptoms resemble so closely those of toxemia and because the differential diagnosis is so difficult and frequently impossible, it is generally considered as such. Nephritis complicating pregnancy may be either of the acute or chronic type.

Acute nephritis fortunately occurs rarely during pregnancy. It presents the same findings as in the non-pregnant state with hypertension, hematuria, casts, nitrogen retention, etc., and might simulate marked nephrosis. It should be considered as a grave complication requiring in most instances termination of the pregnancy as soon as the diagnosis is made. The differential diagnosis from the other toxemias is based on the urine and blood findings and its sudden onset, with postabortal or postpartum clearing of the process.

Chronic nephritis complicating pregnancy is often insidious in its onset. The patient, more often than not, will give no history of previous renal difficulty and all examinations at the onset of pregnancy may be normal. As a rule this condition tends to make its appearance earlier in pregnancy than does pre-eclampsia. The most common complaint is headache which tends to be dull and general rather than acute and frontal as in the true toxemia. Lassitude and general malaise are often present and in the severe cases visual disturbances and changes in the ocular fundi appear. Hypertension is uniformly present but its degree varies greatly. The systolic pressures range from 140 to well over 200 mm. with corresponding diastolic pressures. Repeated checks will show the pressure fairly constant with the general trend upward. Albuminuria usually occurs in varying degrees and casts may be present. Renal function tests (concentration and urea clearance) frequently show evidence of impairment of function. In advanced cases oliguria may occur. Edema which may be marked is usually present. Blood chemistry more frequently gives evidence of nitrogenous retention than in eclampsia.

Eclampsia

Pre-eclampsia and eclampsia represent only different stages of the same disease. As was previously stated the exact etiology of the disease is unknown. Recent investigations by Newburgh[3] and Strauss[4] strongly suggest that it is the result of undue water retention. The exact change which causes this is not apparent but experimental evidence suggests that the retention may be conditioned hypoproteinemia and excess sodium. Certain physico-chemical changes in the relationship between the blood plasma, the interstitial fluid and the intracellular fluid resulting in the symptoms of toxemia were recently presented by McPhail[5] which help to rationalize the prevention and management of toxemias.

Edema is usually the first sign to make its appearance and this is best determined in its early stages by careful check of the weight at frequent intervals. Hypertension subsequently makes its appearance but as a rule is less marked than in nephritis. Albuminuria also appears later than in nephritis and is generally less marked as are other evidences of renal damage. The reason for this, recently pointed out by Herrick[7] et al is that the role of the kidney is probably incidental rather than fundamental and that it participates because it is such an important part of the circulation. Visual symptoms may appear but the ocular fundi rarely show more than arteriolar spasm in the early stages. Nausea and vomiting are not uncommon. Cerebral disturbances as shown by mental or motor irritability, appear in the advanced state and finally convulsions occur.

Prophylaxis and Treatment

One of the most important considerations in the prevention of toxemias is very careful investigation of the patient at the time of first examination. This should include a complete physical examination, careful check of blood pressure, complete urine, blood counts and serology. If any evidence of abnormality in the cardiovascular or renal systems exists, further investigation is immediately indicated.

If the patient is normal in all respects, it is then advisable to give instructions in regard to dietary needs, danger symptoms and prenatal follow-up. In general we feel that women during pregnancy should have a well balanced diet. Since there is evidence that hypoproteinemia may influence water balance we feel that a minimum of 50 Gms. of protein should be taken daily. The other substance which is known to be related to water balance is sodium. We advise against excess amounts of sodium in any form.

The patient should be seen at least once a month for the first six months and the weight, blood pressure and urine checked at each visit. During the seventh and eighth months visits should be every two weeks and during the last month once a week. The reason for greater frequency in the last trimester is that during this period we see the greatest instance of toxemias. In addition to the items mentioned the patient should be questioned in regard to headaches, edema, return of nausea and vomiting, etc. The check of the weight is essential because this is the best criterion of the development of invisible water retention or occult edema which occurs before pitting edema can be observed. The average weight gain of the pregnant woman should not exceed 20 to 25 pounds. A persistent weight gain of more than 1.5 pounds per week can almost invariably be regarded as evidence of water retention.

As soon as any variation from the normal makes its appearance, the patient should be regarded with suspicion and more thoroughly investigated.

Essential Hypertension: When a patient with known hypertension becomes pregnant or when hypertension appears in the absence of other findings, the patient should be carefully watched for further elevation. She should have as limited physical activity as is compatible with her mode of living and should have mild sedation. She should have plenty of fluids and a light diet with limited sodium chloride and average intake of protein. Limitation of activity and mild sedation with phenobarbitol (½ grain three or four times daily) are most important in the prophylaxis. Any decision regarding the termination of the pregnancy must be made after careful evaluation of all factors. Since all available information indicates that the majority of these patients will have an increase in hypertension due to the pregnancy and that some will go on to develop so-called malignant hypertension, it would seem just to consider termination of pregnancy when a progression of the disease is noted in order to prevent later difficulty.

Nephritis: There is little to be said about the prophylaxis of acute nephritis since it is an incidental complication of pregnancy. Obviously the maintenance of good general health and the avoidance of acute infections are essential. When the condition makes its appearance, the patient usually becomes rapidly worse and if the diagnosis can be definitely made, immediate interruption should be considered. The remainder of the treatment should be that of acute nephritis.

Chronic nephritis, in general, should also be considered as an indication for termination of the pregnancy. Unfortunately, as has been said, the differential diagnosis between a mild nephritis and pre-eclampsia is frequently extremely difficult. Several items may assist in the differentiation. The majority of true toxemias appear in the last four to six weeks of pregnancy and it is extremely rare to see one before the seventh month so that albuminuria and hypertension, etc., appearing in the first two trimesters with rare exceptions are of nephritic origin.

Repeated renal function tests may help. If the urea clearance is constantly lowered and if the concentration test shows impairment we may suspect nephritis. Study of the ocular fundi offers a valuable aid in differentiation. In toxemias, spasm of the retinal arterioles, retinal edema and occasionally detachment of the retina or fresh hemorrhage are seen, while in nephritis arteriosclerotic changes, exudate and hemorrhage are apt to be present.

If the differential diagnosis can be made, it is generally agreed that because of the almost certain further injury to the kidney and because of the distinct increase in the tendency for spontaneous termination of the pregnancy due to placental infarctions that termination should be advised. If after full explanation of the situation, the patient chooses to continue with the pregnancy or if the exact diagnosis cannot be made, treatment the same as that to be described for toxemias should be instituted.

Eclampsia: In pre-eclampsia with the first appearance of symptoms and signs the patient should have definite limitation of activity. In view of the evidence that water retention plays an important role in the condition, measures to combat this are instituted. Since sodium is an important factor the patient should have a diet low in sodium. An additional feature of dietary management which will aid in liberating stored fluid and sodium, as pointed out by Gamble and Newburgh, is the use of diet which will yield a neutral or slightly acid ash. Figure I and II. If further acidification is desired to aid in this elimination, the addition of ammonium chloride in doses of 8 to 15 grams daily for three or four days can be given. This salt is used to release the sodium ions from the tissues. After absorption from the gastrointestinal tract it is broken down in the liver to form urea and chloride ions. The latter conjugate with the sodium from sodium acid carbonate NaH2CO3 and the sodium is excreted as sodium chloride. With prolonged use of ammonium chloride the kidney has a tendency to reconvert the urea to ammonium ions and excrete it as ammonium chloride leaving the sodium in the body. Hence it should not be used for more than three or four days. It should be given in gelatin capsules, in order to avoid gastric irritation and vomiting. In order to maintain nitrogen balance and to prevent a lowering of serum proteins a diet containing about 85 grams of protein is used. If the patient is losing large

FIGURE I.

An Acid Ash:	A Neutral Ash:	A Basic Ash:
Meat	Butter	Milk
Fish	Cooking fats	Cheese
Eggs	Salad oils	Vegetables
Cereals and their products	Sugar	Fruits (with the exceptions under "acid").
Breakfast cereals	Tapioca	Beans (lima, kidney)
Bread	Vinegar	Almonds
Rice	Gelatine	Chestnuts.
Macaroni	Cornstarch	
Spaghetti	Tea	
Hominy	Coffee	
Corn		
Lentils		
Peanuts		
Walnuts		
Prunes, Plums, Cranberries	Containing benzoic acid which is conjugated with glycine and excreted as hipuric acid.	

This diet is characterized by a low Na content and a neutral or acid ash. The food is prepared and served without salt. Bread made without salt and sweet butter are used. Care must be taken not to use foods preserved with salt (ham, bacon, pickles, olives). Only cottage cheese and fresh water fish are allowed.

FIGURE II.

Suggested Arrangements of Foods.

Meat or fish—1 large serving.
Eggs—3 (or 1 egg and 1 serving of meat or fish).
Bread—4 slices.
Cereal—1 serving (any cooked cereal. Puffed wheat, or rice, Quaker shredded wheat.)
Rice, macaroni or spaghetti—1 serving.
Milk—4 glasses.
Fruit—2 servings. (See
Vegetables. List)
Butter—6 pats.

This list will meet the nutritional requirements of the pregnant woman and at the same time will yield a neutral ash. This combination will furnish almost 85 gms. of protein and 2100 calories. Additional calories can be obtained from more bread, salad oil, sugar and candy, desserts using cereals. If fewer calories are desired use skimmed milk, less butter and fruits canned without sugar.

amounts of protein in the urine, this is of particular importance.

Fluids should be forced. A urinary output of 2500 cc. will be ample unless great renal impairment exists. The importance of abundant fluids has been emphasized by Newburgh. He points out that the water loss by evaporation from the lungs, through the skin and in the stool, which ordinarily amounts to 1200 to 1500 cc., is supplied first and the remainder of the fluid taken is available to the kidney for excretion of urinary solids. Under normal conditions it requires about 12 cc. of water to excrete 1 gram of urinary solids but if the kidney is damaged, much more may be needed. Therefore, it is desirable to maintain the fluid intake above 3000 cc. daily.

If the symptoms are mild, the above regime can be carried out at home with success. If the condition is more severe the same treatment is used but the patient is observed more closely and hospitalization with bed rest is desirable. Under this treatment the majority of patients will improve and the condition may clear up entirely. If, however, the patient becomes worse and eclampsia seems likely, termination of the pregnancy, by the most conservative means for that particular patient, is advised. With close observation and adequate treatment, however, the incidence of true eclampsia should be materially reduced.

In eclampsia the convulsions may be controlled by various means. Morphine may be used but it does depress the respiratory center quite severely. Intramuscular injection of phenobarbitol sodium is fairly efficient. In our hands the use of Avertin in a dose of 50 to 70 mg. per kilo. of body weight has proved very effective. Fluids must be given parenterally. The dehydration therapy of Arnold and Fay has been used successfully by the originators but we favor the use of abundant fluids in order to supply the kidney with enough water to excrete all of the urinary solids and prevent tissue damage. There is disagreement in regard to the use of isotonic or hypertonic fluids. In general we give 50 to 100 cc. of 50 per cent glucose immediately to reduce intracranial pressure until adequate sedation can be accomplished. This is followed by continuous 5 per cent or 10 per cent glucose intravenously, given at the rate of 200 to 400 cc. per hour. The heart must be watched for evidence of cardiac failure, dilatation of the right side, which will result in pulmonary edema. If this should occur the fluid should be stopped temporarily until the heart is able to function properly.

Unless very severe kidney damage has occurred diuresis will usually be noted in 8 to 10 hours on this treatment and the patient will usually improve markedly. When the general condition is improved, further treatment of the pregnancy is considered. If beyond the period of viability induction of labor is usually considered advisable. If before this period, some favor carrying the patient further along but most obstetricians interrupt because of the danger of serious damage to the patient if allowed to continue. The method of termination of pregnancy will vary depending on the conditions in each patient but in general conservative measures should be employed. Cesarean section as a rule is not considered a desirable procedure in eclampsia.

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Child and Maternal Health Program in South Dakota

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RECENTLY, the State Board of Health, through its division of Child and Maternal Health, appointed an advisory committee to aid this department in, as the name implies, an advisory manner. This committee is composed of three physicians, practicing in the extreme east, west and central portions of the state. One member is a pediatrician, one a general practitioner with a large obstetrical practice and one is a general practitioner, whose background includes work in public health. While this committee has not yet met to organize and recommend policies, it is felt that through such a committee, and the coöperation of the state medical personnel, more can be accomplished to further child and maternal health.

The set-up of the work of the health department will be much the same as in the past. The coöperation of the practitioners of the state has been splendid and we feel that with the help of the new committee in an advisory capacity, it will be possible to gain the coöperation of the public. This is essential, and much effort is now being directed at gaining this coöperation by the division of Child and Maternal Health of our State Board of Health. Certain, it is, that no amount of knowledge on the part of the physician can help in prenatal care if the patient will not come to him before confinement. Literature distributed to the expectant mother by the State Health Department is an example of the methods now employed to gain their coöperation. Part of this literature is in the form of a monthly prenatal letter. These letters are sent to the mothers through the request of their physician or—in the counties where county nurses are employed—at the request of such nurse. Each letter is made up of information bearing on the prenatal period and an explanation of the importance of consulting the physician who will manage the confinement, or some other physician if it is impractical to see her confining physician.

The general outline of the work being carried on by the state department is as follows:

1. Prenatal Care.
   - A. Literature distributed.
   - B. Conferences.
   - C. Classes.
   - D. Home Visits.
2. Aiming at Better Care at Delivery.
3. Postpartum Care.
   - A. Literature.
   - B. Classes in Child Hygiene, etc.
   - C. Conferences.
   - D. Home Visits.
4. Pre-School Care.
   - A. Conferences.
   - B. Immunization Clinics.
   - C. Distribution of Biologicals.
   - D. Literature.
   - E. Limited Distribution of Codliver Oil.
   - F. Home Visits.
5. School Age.
   - A. Conference, Medical & Dental.
   - B. Immunization Clinics.
   - C. Literature.

†Chairman of state committee on child and maternal health.

Prenatal Service, through the medium of letters as mentioned above, to the mother. These letters are *requested by the physician on cards supplied him through* the State Board, to be filled in as follows:

Reported by_____ County_____
Name (patient)_____ Address_____
_____ Expected date of confinement _____

Other publications sent with the prenatal letters are:

Letter I—The Expectant Mother.
Letter II—Food Guide.
Letter III—What Builds Babies.
Letter IV—Why Drink Milk.
Letter V—Why Sleep.
Letter VI—Keeping the Well Baby Well.
Letter VII—Prenatal Care.
Letter VIII—Why Register.
Letter IX—Infant Care.

It would be of interest and benefit to go into the contents of these letters but space will not permit. The prenatal conferences are prenatal clinics, where this can be arranged. But, for the most part they are conferences with expectant mothers by public health nurses for the purpose of advising the patient and acquainting her with the necessity of medical prenatal care, encouraging her to seek care and advice at regular intervals. Classes are held in counties where public health nurses are employed. (There are 25 such counties in this state.)

Aiming at Better Care at Delivery: This has in the past been accomplished through the establishment of clinics for physicians in a few of the larger centers of the state. The clinics have been conducted by obstetricians from schools of neighboring states and have been very helpful.

Postpartum Care: Here again literature distributed to the expectant mother has been of great value. This literature has done much to aid the physician to put the care and feeding on a scientific basis and to wean the mother from superstitious rights, which have been in the past and still are to a great extent such a hazard in the infant's first year of life. Further, in those counties where nurses are retained, classes are conducted, as well as postpartum calls made in many instances, if the physician desires it. Child hygiene and home nursing are taught.

Conferences or clinics are held, where it is possible to do so. At these the baby is examined, and defects are noted, particularly those defects which are amenable to correction and which have a bearing on the infant's future health. To my mind, this is the only type of clinic that is worth the time spent on it. I am opposed to the baby shows, where baby is examined and given a prize for the most perfect physique. The normal is made up of averages, and one baby within limits may be normal for its body and still not be average. I once saw one of these clinics conducted when the thermometer was over 100 in the shade. All the babies had a heat rash and all lost points because of it. I know of one babe whose ear lobes did not please the examiner, the parent being told that the lobes should be like those of the examiner. I mention these instances only to show how ridiculous the infant clinic can be made.

Our efforts should be directed at finding defects that can be corrected and advising the parent of the possibilities of correction, and the dangers of neglecting correction. These clinics are conducted by practicing physicians in the area. Often the State Fair is utilized as a time to conduct such clinics, when many are there and when the services of competent physicians can be obtained. Without criticizing this practice, I wonder if we should encourage parents to bring these infants to so large a gathering, when it is often so hot, knowing that the rest of the day baby will, in all likelihood, be lugged about the fair grounds in the dust and heat.

Pre-school Care consists of conferences or clinics. These children are examined much the same as the postpartum child with the idea of finding all defects which can, and should be, corrected. Here attention should be given to the possibility of tuberculosis. There is much controversy as to the value of the tuberculin test. A positive Mantoux calls for an X-ray, which should be interpreted by one who is competent to do so. The physicians of South Dakota may, if there is any doubt in their minds as to the interpretation, send their films to the state sanatorium for examination and diagnosis. The positive Mantoux that is not followed by X-ray loses most of its value.

The Immunization Clinic for Pre-School Children: There is some difference of opinion as to the advisability of giving the immunization for scarlet fever. Many of our leading men do so routinely, while others employ it only at the request of the parent. There is no controversy, however, over the use of diphtheria immunization (or if there is, it is only in the method and dose to employ). This is offered at all our pre-school immunization clinics, as is vaccination for smallpox. If these have been given the year before, the parent is advised to have the Schick test and a second vaccination as a test. As has been mentioned, the tuberculin test is here offered. The state furnishes the biologicals for these clinics. Scarlet fever serum is not available from the state.

Pre-school health is also furthered by the distribution of literature. Following are some of the topics treated: (1) Communicable Disease, (2) Communicable Disease Control, (3) An Excellent Communicable Disease Chart, (4) Tuberculosis; and seven other pamphlets on these subjects. Others for the care of the pre-school child are: (1) Child from One to Six, (2) Child Management, (3) Food Guide. There has been a limited distribution of cod liver oil to those who are in need, and whose daily diet was not considered adequate. Some of this has been to the expectant mother as well. It is certain that in these times many of the conditions noted in the daily round of the general practitioner are the direct result of malnutrition, and while cod liver oil will not furnish all that is lacking, it has helped to fill some of the gaps.

School Age: Immunization clinics in this group are simple, and many can be served in a day if adequate nursing and clerical help are available. The immunizations are the same offered in the pre-school clinics. Here again the Mantoux is offered and advised, with the idea here, as well, that positive tests should be followed by X-ray. Medical and dental clinics, or conferences, are arranged, where possible, for the finding of defects which are amenable to correction, and which are detrimental to the future health. Defects which are not detrimental, but are only causematic, will probably be asked about and, if so, advice will be given; but to advise such correction when not asked, is not the wisest practice for reasons that are apparent.

Literature can be given to the child, after he has reached the reading stage, as well as to the parent. Much material of this kind is now available, graduated to the capability of the student. Literature is also distributed to the teacher, as it is felt that there is much that the teacher should know and much that the teacher can accomplish with this knowledge. A pamphlet is now being put into the hands of every teacher, "What Every Teacher Should Know About the Physical Condition of Her Pupils."

The above briefly is a resume of the program of the State Health Department in behalf of Child and Maternal Health, with a few comments by the writer, which have nothing to do with the program. Particularly should we be interested in any effort to bring down an altogether too high infant mortality rate, and reduce the maternal death rate. In the past few years, the profession has been made conscious of the necessity of bettering these conditions, and I believe as a whole, the profession has made a great effort to practice better obstetrics. We shall have to go farther, we must educate the public, the expectant mother—yes, grandparents and other relatives—to the necessity of prenatal care, best conditions for confinement, and postpartum care.

It has also been suggested that frequently the physician, after delivery, gives all the attention to the mother, sometimes even at the expense of the infant. Surely, we should all realize that this is a critical period for the new life, and much can happen quickly. This is the time when we should watch the infant.

Prophylaxis of Puerperal Sepsis

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CONSTANT discussion of the subject of puerperal sepsis is necessary if we are to hope for the ultimate eradication of this dread disease. Knowledge of the cause and prevention of puerperal sepsis is constantly being broadened by exhaustive study. Although maternal mortality due to infection has decreased from 10 per cent of patients who entered maternity hospitals, prior to the advent of our knowledge concerning the nature of infections, to 0.22 per cent at the present time, the mortality rate from this cause is still too high.

A majority of fatal cases arise from exogenous sources. The attending physician may be responsible for introducing the offending organisms in a large percentage of these cases. The Public Health Relations Committee of the New York Academy of Medicine, after an exhaustive study of maternal deaths, concluded that 75.1 per cent were preventable. The physician was considered responsible for 81.7 per cent, of which 65.5 per cent were errors in technique, and 34.5 per cent errors in judgment. A more significant study is the one recently reported by Peckham, covering 447 maternal deaths occurring in the strictly rural areas of Maryland, during the years 1930 to 1936. It is interesting to note that 89.6 per cent were attended by physicians. Still more interesting is the fact that 60 per cent terminated as normal deliveries. Sepsis accounted for 34.18 per cent of the deaths. The national maternal mortality rate, from this cause, during that period, was 37.75 per cent. On analysis of Peckham's figures it is found that 34.61 per cent of whites died of infection, 21.1 per cent following infected abortion, and 13 per cent from true puerperal sepsis.

Williams, Watson, Colebrooke and others have proven 60 per cent to 70 per cent of puerperal sepsis to be due to the betahemolytic streptococcus, either alone or in mixed infection. It is asserted by Douglas that more than half of maternal deaths due to puerperal sepsis are due to this organism. Watson and co-workers at Sloane Hospital, found the great majority of these infections to be of exogenous origin. Endogenous bacteria account for many instances of low grade infection and thrombophlebitis. It is the exogenous infection against which we must wage our never ending battle. DeLee has shown air-borne infection to be a hazard; however, the real source of danger lies in introducing bacteria directly into the birth canal. This puts the burden of responsibility upon the shoulders of the medical profession.

With the advent of the antiseptic and aseptic era, there was a phenomenal drop in the maternal death rate due to infection. However, as the dread of this ever present danger has been removed, men have become more daring in operative procedures. As a result, although death rates from other obstetrical complications have decreased, deaths from infection have not. In 1929, Adair and Tiber made the gloomy observation that "there has been no noticeable improvement in maternal deaths during the past 15 years." Tandy, in 1935, was more cheerful in pointing out that maternal mortality in this country had decreased each year between 1925 and 1933. During that eight year period, maternal deaths, due to infection, only dropped from 24.3 to 22.1 per 10,000 live births.

Plass feels the high incident of puerperal sepsis is due to "operative furor" born of a false sense of security arising out of improved surgical and obstetrical technic. Is it that we lack due respect for the virulence of the common organisms because of the many antiseptics available? Or is it because of obstetrical fearlessness among unqualified men? Much of it is due to the appallingly high incidence of criminal abortion.

Realizing that preventive treatment of puerperal sepsis is vastly more important than curative treatment, let us review and discuss those points known to all of us, but all too frequently forgotten or neglected, which may aid in the reduction of the mortality and morbidity from this cause. This will be most expeditiously done by discussing it under the following headings: (1) general measures; (2) measures used during the antenatal period; (3) measures used during labor and in the puerperium; (4) a brief mention of treatment in light of preventing spread of a relatively mild or localized infection.

General Measures

Under the heading of general measures must be discussed briefly home vs. hospital deliveries. Advocates of hospital delivery point out the incontrovertible facts that: Major obstetrical complications many times can not be prognosticated nor properly dealt with in the home; that unsatisfactory home conditions are as important indications for hospital delivery as the major obstetrical complications; that major operative procedures are too frequently attempted in unfavorable environment; and, the reason hospital statistics often do not compare favorably with home delivery statistics is due to the fact that many cases, unfavorably affecting the former, are started in the home but end up in the hospital. DeLee believes that the danger of exogenous infection in the general hospital, operating maternity units, is greater than in well conducted home deliveries. He points out that women become relatively immune to the bacteria with which they are in daily contact, while they possess no immunity to those organisms often present in general hospitals. These contentions are supported by the records of the Outpatient Service of the Queen Charlotte Hospital, London, and of the Chicago Maternity Center. The former had 4,165 deliveries without

a single maternal death, while the latter had only one death in over 9,000 deliveries. One cannot help wondering how many cases these outpatient home services sent to hospitals thus favorably affecting their own statistics.

There are many other points to be mentioned under general measures of prophylaxis against puerperal infection. It seems that one of the most important of these is to dispel the erroneous belief that modern antiseptics will protect our patients against exogenous infection. Unfortunately many breaks in technic arise because of this belief. We are prone to slight scrubbing our hands feeling that the alcohol and lysol, or whatever antiseptic we use, will "get" the bacteria we fail to remove. Vaginal examinations are more readily and repeatedly performed with the serene belief that the antiseptics will kill the "bugs". Under this false sense of security, we are often tempted to indulge in radical interference with less hesitation.

General hospitals conducting maternity services should have completely isolated units with separate nursing and housekeeping staffs and no departmental interchange of help or interns. Individual kitchens, pantries and laundries are desirable. Even the entrance to such units should be separate from the main building, if this is possible. Williams did not share the belief of DeLee that general hospitals should not conduct maternity services, providing there is proper isolation of the unit. It is desirable that each pregnant or puerperal patient be exposed to as few contacts as possible, in order to reduce the danger of carrier infection.

Education of the laity to seek premarital, prepregnancy and early prenatal examination and advice is doing much to reduce maternal complications. The importance of this cannot be over emphasized. Many venereal infections are eradicated in this fashion. Cervical infections can be treated before pregnancy occurs; foci elsewhere may be eliminated and the general resistance of prospective mothers improved by proper supportive and corrective measures. General dissemination of contraceptive advice and material has been offered as one remedy to the ever increasing incidence of infected criminal abortion.

Antenatal Measures

Our greatest service to maternity patients probably comes during labor and delivery. On the other hand we can do much during the antenatal period to obviate complications late in pregnancy. Proper prenatal care will bring our patient to the crucial time of delivery in the best possible condition. In our efforts to prevent puerperal infection, measures designed to build up resistance should be the essence of antenatal care. Complete physical examination and history may reveal latent disease requiring special handling. Complete blood studies will often uncover an unsuspected low grade anemia the correction of which may mean the difference between success or failure in preventing or treating a puerperal sepsis. Instruction in the essentials of diet, particularly in respect to vitamins and minerals and undue weight gain, is an important factor in building adequate resistance. Supplementary vitamins and minerals, especially vitamin D with calcium and iron may be indicated. It is most important in preventing infection to educate patients in the proper hygiene of pregnancy. They should be warned against the dangers of introducing infection into the vagina by self examination, coitus, especially after the seventh month, and the taking of unnecessary douches. Vaginal infection should be eliminated by active treatment as early in pregnancy as possible. Routine douching or instillations as prophylactic measures in normal cases are not necessary. It should be recognized and patients taught that generally speaking they are relatively immune to their own bacteria, and that the normal vagina has a mechanism of prophylaxis which is quite efficient if it is not interfered with.

Workers at Sloane Hospital have reported recovery of hemolytic streptococci from 3.4 per cent of all cases admitted to that institution and although patients from whom they were recovered have a higher incidence of puerperal morbidity than non-carriers, still only 12.2 per cent of them have febrile puerperal courses. On the other hand, manipulation and obstetrical operations definitely increase the incidence of morbidity in this group beyond that of similar maneuvers in the non-carriers. On this basis it is wise to reduce the number of vaginal examinations, performed during the antenatal period, to a minimum. Vaccination and immunization against the common offending organisms has been suggested, but where tried in fairly well controlled groups has met with little if any success.

Measures During Labor and the Puerperium

It is during labor that we must exercise our greatest care in preventing the access of infecting organisms to the birth canal. In hospitals it is desirable to isolate all unknown cases presenting themselves for obstetrical care the first time, during labor. Likewise is it desirable for attending men to handle patients, with whom they have had no previous contact, as potentially contaminated. All patients should receive routine preparation, including shower bath, if time permits, not just clipping of the vulval hair, but careful shaving followed by meticulous scrubbing with soap and water. The lower bowel should be emptied by means of tap water or soap suds enemas. The vulva and area immediately surrounding it may or may not be sprayed with some non-irritating antiseptic. Colebrooke feels that there is no particular choice of antiseptics and that probably soap and water would do just as well. Stressing antiseptics undoubtedly detracts from other more important aspects of aseptic technic.

Masking of all attendants has been stressed by many, notably Watson and his co-workers at Sloane Hospital. They emphasize the necessity of covering completely both nose and mouth. During the epidemic of puerperal sepsis occurring in 1927 they found the source of infection to be the nose and throat of nurses, interns and attending men. It is now routine in most maternity hos-

pitals to periodically culture the upper respiratory tract of all obstetrical attendants and to remove from duty all strept-carriers. It is obviously impossible to carry out such elaborate technic in many instances, but it would seem even more desirable in general hospitals caring for obstetrical patients. It goes almost without saying that no one with coryza should be admitted to the labor or delivery room. Patients with acute upper respiratory infections should be masked. Those who have wide experience in the care of puerperal sepsis feel that it is most desirable for everyone to mask completely whenever the vulva and perineum is exposed even for routine rectal examinations. Titus reports the reduction of the incidence of maternal infection in his institution from 19.9 per cent to 8.92 per cent by the simple expedients of masking and the vaginal instillation of antiseptics.

The matter of routine periodic vaginal instillation of antiseptics is a controversial point. As mentioned, Titus is a strong advocate of this maneuver, advising either 4 per cent mercurochrome or 1:5,000 aqueous merthiolate. On the other hand Mengert feels that they are of little or no value. Colebrooke writes, "It is inadvisable to attempt to improve upon nature's arrangements for keeping the genital tract free from pathogenic bacteria. Our efforts should be directed toward conserving the resistance of the patients, rather than toward dubious attempts to annihilate bacteria."

It hardly seems necessary to caution against too frequent examination during labor, yet in institutions training nurses or interns this is a real hazard. The incidence of sepsis is in direct proportion to the frequency of examination. Particularly is this true of vaginal examinations. Most authorities agree that one vaginal examination done under the strictest of surgical technic is comparatively innocuous but as routine they are decidedly contra-indicated. Even rectal examinations may prove dangerous. Pushing the mucosa roughly into the cervix or against the presenting part may light up a latent cervical infection. Whenever it becomes necessary during the second stage to perform a vaginal examination, the vulva and introitus should be flushed thoroughly or wiped with sponges soaked in an antiseptic or green soap solution. The labia are then separated with one hand and the examining finger introduced without touching the surrounding tissues.

Long labors necessitate the exercise of increasing vigilance against infection. Exhaustion, dehydration and trauma are probably more important as predisposing causes of sepsis than operative procedures performed to terminate these labors. Organisms to which a patient has relative immunity may become distinctly pathologic with trauma and lowered resistance. Naturally, operative deliveries predispose to infection by the possible introduction of exogenous organisms. The incidence of sepsis increases proportionately with the length of labor and the severity of the operation performed. We are all guilty at some time or other of performing major operative procedures on patients in only fair or poor condition without defensible indications. We may be accused of that compulsive urge to "do something." Generally speaking, however, those who have published the best results have an unusually low incidence of operative or "active" interference.

One other important phase of intrapartum prophylaxis is the conduct of the third stage. A too hasty or vigorous attempt to express the placenta may lead to severe hemorrhage with subsequent anemia and lowered resistance. Control of bleeding from lacerations or partial placental separation should be immediate. Repair of laceration must be carefully done with the best aseptic technique. In this regard it is doubtful if routine inspection of the cervix is indicated. About 4 per cent of cervixes are lacerated to a sufficient degree to necessitate repair. Williams felt, and his opinion is concurred in by many today, that inspection of the cervix in the absence of active unexplained bleeding, is meddlesome interference which leads only to an increased incidence of puerperal infection.

Deep and prolonged anesthesia, especially with ether, is prone to produce atony of the uterus with consequent postpartum hemorrhage. All of us will admit the usefulness of analgesics and anesthetics in preventing undue fatigue, and in conservation of a patient's resistance, while on the other hand, recognizing the dangers involved in their promiscuous use. Of no little importance in regard to the use of analgesics in early labor is the danger of infection arising out of the universal tendency for patients to clutch at the vulva and to thresh around thus rubbing infection into the vagina. In considering the safety rather than the comfort of our patients, it is better to have no medication rather than those used injudiciously.

Prophylaxis of infection during the puerperium is primarily a matter of nursing care. Routine four hour temperature charts should be kept on all patients. Those patients who have been unknown quantities prior to the onset of labor should be placed in observation wards until they have been found to be free of infection. Where routine culturing of the vaginal flora is performed, all carriers of the hemolytic streptococci are isolated. Any patient with elevation of temperature subsequent to the first twenty-four hours postpartum should also be isolated. Mothers having infected babies should not have any direct or indirect contact with those with normal infants. The converse of this is true. The ideal, as far as nurseries are concerned, is to have three, one for normal infants with normal mothers, one for normal infants with infected mothers and one for infected infants. Of course, where this is impossible, the infected or potentially contaminated infant should receive individual care.

Proper nursing care calls for definite routine. Each nurse should have sufficient time in order not to be rushed to the extent that she may slight the prescribed technic for care of normal patients. Carriers should be eliminated and all attendants should be required to mask both mouth and nose for perineal care. The same should be required of anyone inspecting the perineum. The hands and arms should be scrubbed for a minimum of two minutes with soap and running water before

touching the vulva. It is ideal to have individual equipment for each patient, but where this is not possible each item should be sterilized before being used. The patient must be emphatically instructed under no circumstances to adjust her perineal pad, or to touch the vulva. Most units make use of pitcher perineal douches, of sterile water or mild antiseptic solutions at periodic intervals and following each micturition or defecation. Episiotomies or perineal repairs, of moderate degree, usually require no special attention.

Measures Designed to Prevent Spread of Infection

Once a true infection has developed much can be done prophylactically to prevent its spread. A patient is usually considered to have a puerperal sepsis when the temperature is elevated to 100.5 F. on two successive days exclusive of the first twenty-four hours postpartum. Such a patient should be isolated and treated with "intelligent neglect." Treatment of puerperal sepsis is comparable to treatment of infected abortion. The average case of postpartum infection becomes manifest by the third or fourth day and where there is a fatal outcome it classically occurs on the tenth day. Where evidence of infection does not develop until late, i. e., eight to twelve days, the offending organism is most likely to be the gonococcus. The essence of treatment is conservatism. Active or radical treatment usually arises from that previously mentioned compulsion to "do something." Advocates of this type of treatment seem to forget that the greater number of causative agents spread by hemolysis and direct invasion. Few, except the gonococcus, spread by extension along the mucosa. Instrumentation can not hope to reach organisms deep in the uterine wall or lymph channels and only serves to stir it up. Nature has provided a protective mechanism in the uterus which, if left alone, will often localize infection to the endometrial cavity. Advocates of active treatment fail to realize that infection in the uterus can not be compared with a surface infection. The only indication for invasion of the uterus in these cases is uncontrollable hemorrhage. Both Williams and DeLee favor conservatism, feeling that it is "less dangerous to leave a uterus full of infected ovular remnants to the powers of nature."

Conservative treatment, briefly, consists of bed rest with elevation of the head of the bed to promote drainage. The uterus should be in fair contraction, even if it is necessary to administer ergot. Keep in mind that toxic cases have a reduced resistance to ergot, hence periods of rest in its administration should be observed in order to prevent ergotism. The bowels should be kept as quiet as possible with a liquid or semi-solid diet and opiates if necessary. Control of pain should be with caution for fear of covering signs and symptoms of spread. Fluids are important, and incidentally, nourishment may be administered intravenously in the form of glucose. Infrequent examination is advisable relying on the clinical course to follow the progress of the infection. Repeated small (200 to 250 cc.) whole blood transfusions have proven of the greatest value in treating this disease. Sulfanilamide has been used with good results by some men. However, a caution should be given against its indiscriminate use in infections of unknown origin. Culture of the lochia, uncontaminated, directly from the uterus with identification of the streptococci by cultural methods has been advised before sulfanilamide is used. Administration of thyroid as a circulatory stimulant has been advised in order to prevent venous stasis and thrombophlebitis. Local heat in the form of douches, Elliott therapy, or diathermy should be postponed until some degree of localization has been effected. Drainage of large collections of pus, when sufficiently localized, is done preferably by colpotomy, but may be done from above if it is walled off from the general peritoneal cavity. Antistreptococcus serum and immuno-transfusions are still experimental and are best left to the large clinics for the present. After allowing a reasonable length of time for localization to occur, evacuation of the bowel may be effected by mineral oil, stupes and rectal tube, Harris tidal proctoclysis or low tap water enemas.

An effort has been made to review those points of importance in the prophylaxis of puerperal sepsis which we all know, yet concerning which we need constant reminding. Prophylaxis is vastly more important than curative treatment. There are no shortcuts to proper treatment of this disease. "Only an organized effort on the part of all, an insistance on uniformity of methods, a loyalty of purpose and, finally, a repetition of details that becomes ritualistic and automatic in performance will bring the desired results." Exercise of the greatest judgment, avoiding harmful intervention and uncalled-for radicalism while realizing that the outcome of puerperal infection is largely dependent upon the patient's own powers of resistance will lead eventually to the reduction of this maternal complication to the irreducible minimum. The compulsion to "do something" should be checked by the realization that nature often corrects seemingly impossible difficulties if just given time. It has been said that the greatest virtue of an obstetrician is patience.

Maternal and Infant Mortality in Montana

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IN recent years many studies have been reported on maternal and child health. Public interest has been aroused. Some articles appearing in the lay press have been erroneous due to misinformation, failure to consider all aspects of the problems or through incorrect interpretation of facts. Since 1922 there has been a steady reduction in both the maternal and infant mortality rates in Montana.

Every maternal death has been investigated by the Committee on Maternal and Child Health of the Montana State Medical Association since 1937. It is known that some women have lost their lives as a result of inadequate care during pregnancy, labor or puerperium. The responsibility for this unnecessary loss of life must be assumed either by the community, the family, the individual, the physician or the attendant at the time of delivery. Before any definite conclusions are drawn regarding problems of maternal care in Montana, and before conclusions can be drawn regarding factors to be considered if the maternal mortality rate is to be brought to the irreducible minimum, a study of all births must be made. It is unfair to judge the maternal care situation solely from maternal deaths. Data must be made available to indicate the kind of care given mothers throughout the period of pregnancy, the facilities available for care in Montana, and the social, economic and educational factors which influence the type of care received as well as the availability of optimal medical and nursing care.

The following statistical data is presented through the coöperation of the Maternal and Child Health Division of the Montana State Board of Health and the Committee on Maternal and Child Health which serves as an advisory committee to that Division.

Montana entered the birth registration area in 1922. The maternal mortality rate has dropped from nearly 80 per 10,000 live births in 1922 to 37 in 1937 with a provisional rate of 36 for 1938. Only six states in the Union had a lower maternal mortality rate than Montana in 1937. Connecticut with 25 deaths per 10,000 live births had the lowest rate for that year. What factors have brought about this marked reduction? What can be done to bring about a lower rate? As only 38 deaths from puerperal causes were listed in 1938, study of these deaths is of no statistical significance. However, it is notable that in the opinion of the attending physicians, 16 or 41 per cent of these deaths could have been prevented had the women reported for early antenatal care.

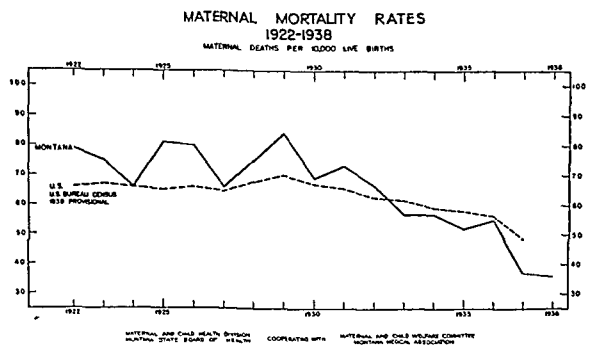


Fig. 1

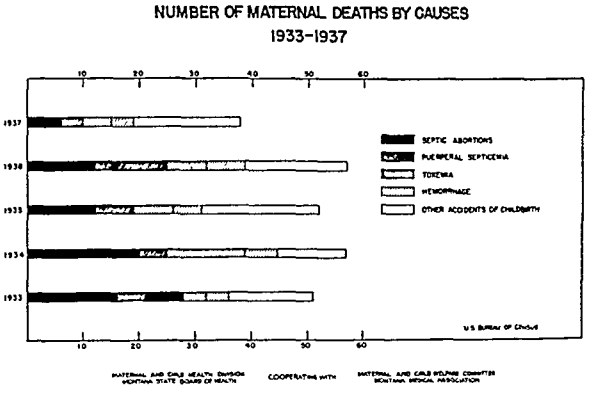


Fig. 2

As the total number of births each year is only slightly over 10,000 in the state, the number of maternal deaths each year is low. A comparison of the causes of maternal mortality for the years 1933 to 1937 is shown in Figure 2. There are and always will be certain hazards related to childbirth and there will be some maternal deaths despite all that education and medical and nursing care can offer. In the year 1937, septic abortion, septicemia, toxemia and hemorrhage, the four conditions in which there is the greatest possibility of prevention, caused 50 per cent of the maternal deaths. In 1933 these same causes accounted for approximately 70 per cent of the deaths.

In the five year period, 1933-1937, 27 of the 56 Montana counties have had fewer than 500 births. In the counties having less than 500 births, one death may make a great difference in the rate for that county, and therefore interpretation of maternal death rates must take into consideration the number of births. The five year maternal mortality rate for Montana was 51 per 10,000 live births. The twenty-one counties shown in black in Figure 3 had a mortality rate higher than the state rate. Seven of these counties—Sanders, Mineral, Beaverhead, Broadwater, Teton, Golden Valley and Carter had less than 500 births for the period studied

†Chairman, committee on maternal and child health, Montana State Medical Association.

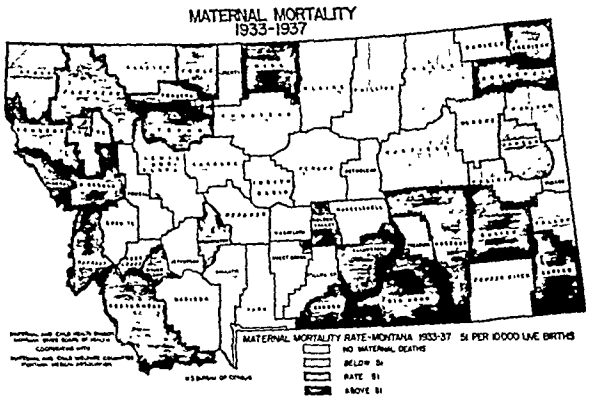


Fig. 3

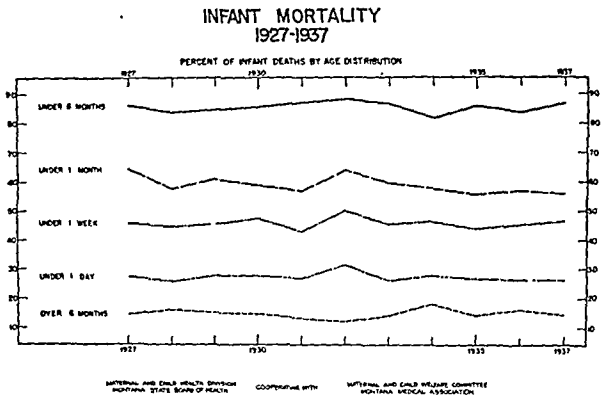


Fig. 5

while the remaining fourteen counties had 500 or more births.

The infant mortality rate for Montana since 1922 as compared with the United States rate is shown in Figure 4. This rate in Montana has dropped from 70 per 1000 live births in 1922 to 50.2 in 1937 with a provi-

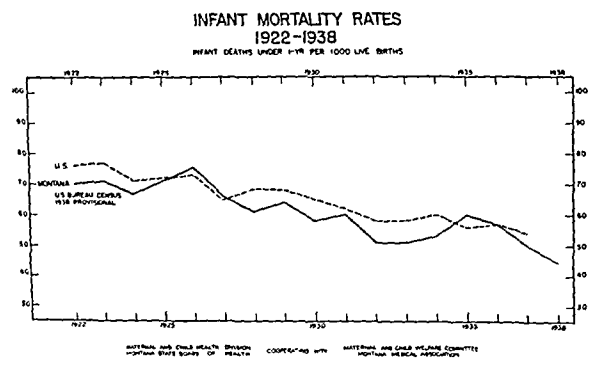


Fig. 4

sional rate of 45.2 for 1938. In 1937, 22 states in the Union had a lower infant mortality rate than Montana, New Jersey taking first place with an infant mortality rate of 39 per 1000 live births.

The age distribution of infant deaths is shown for a ten year period in Figure 5. It is significant to note that although the infant mortality rate during this ten year period has been materially reduced, there has been no reduction in the percentage of infant deaths occurring in the first day of life or the first week of life. There has been some reduction of deaths in the first month of life. Over 25 per cent of the infants who die, die under one day of life, over 45 per cent under one week of life and over 55 per cent under one month of life. If the infant mortality rate is to be lowered, attention must be directed to care of the newborn and care during the neonatal period and to the conditions associated with prenatal and natal care. The responsibility of the obstetrician in relation to these infant deaths is probably greater than that of the pediatrician.

The average infant mortality rate in Montana for the years 1933-1937 was 54 per 1000 live births. Twenty-two counties having a rate higher than the state rate are shown in black in Figure 6. Again the rates must be interpreted in relation to the number of births. Ten of these counties, Sanders, Teton, Jefferson, Meagher,

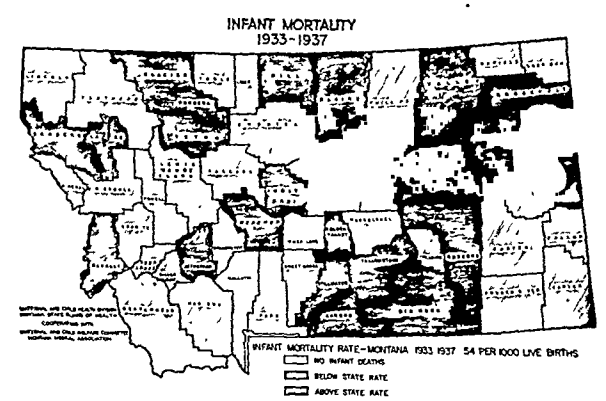


Fig. 6

Judith Basin, Golden Valley, Stillwater, Garfield, McCone and Wibaux had less than 500 births in the five year period. Some of the county medical societies are instituting a special study to determine the cause of their high infant mortality rate.

Responsibility for reducing the maternal and infant mortality rates to the lowest possible level must be divided between the state, the community, the individuals concerned and the medical and nursing professions. Each community has its individual problems; therefore, no nation-wide or state-wide program can be formulated which will meet the needs of all communities. Montana is a large state, sparsely settled with community problems varying from those in mining centers to those in the open range country. Birth certificates indicate that approximately 3 per cent of the women giving birth to live babies do not have a physician in attendance at childbirth. There are less than half a dozen women who practice midwifery in Montana. The majority of non-medical attendants are neighbors or members of the

family who attend the mother at childbirth because a physician is not available. Improved highways in recent years have made it possible for many more women to receive adequate maternal care, but there are still many women who live off the main highways and are unable to receive adequate care, either because of economic conditions or impassability of roads during certain times of the year.

Our changing economic trend has created new problems and some communities find themselves with many medical problems as yet unsolved. In some counties the large number of persons dependent upon some form of relief make it practically impossible for a county physician to render adequate care. In other counties the area is so great that it is impossible for one physician to cover his territory. In most counties the recompense for this work is pitifully small.

Good hospital facilities are an important factor if our maternal and infant mortality rates are to be lowered. The community must be willing to assume its share of the financial burden if good hospital service is to be maintained. Many hospitals, now poorly managed, would render adequate service if properly compensated for the care of the dependent group. Hospital standards for obstetric care have been formulated by the American College of Surgeons. Unless hospitals can maintain standards which will safeguard the lives of maternity patients, the question might well be raised as to whether the hospital is justified in accepting maternity cases.

In many small communities, maternity homes meet a definite need if a hospital is not accessible or if conditions in the home make home deliveries hazardous. These maternity homes are operated without any restrictions, provisions for inspection, or regulations for licensing. Provisions for licensing and inspection by the State Board of Health would safeguard communities against the hazard of questionable maternity homes.

Public Health Nursing service is also an important factor in maternal and infant care. Twenty-four of the 56 Montana counties now have such service. These public health nurses under the direction of the attending physician may go into the homes for health supervision of maternity patients, giving instructions to the mother regarding her care and the care of the newborn baby. They can assist materially in getting pregnant women under medical care in the early period of pregnancy. They can assist the physicians in home deliveries and supervise postpartum nursing care in the home. If the services of the public health nurse are to be utilized to the fullest extent in the maternal care program, physicians must understand the place of the public health nurse in the program and utilize her services for patients under their care who cannot afford private nursing services at the time of delivery and during the postpartum period.

Apart from the economic and social problems and the problems of adequate medical and nursing care, the educational aspect of a maternal care program is of vital importance. Many women and their husbands do not realize the importance of good medical and nursing care throughout pregnancy, and do not seek this care even though it may be available.

It is felt that progress is being made through the joint efforts of the Maternal and Child Health Committee of the Montana State Medical Association and the Maternal and Child Health Division of the Montana State Board of Health. Funds have been made available to the Division under Title V of the Social Security Act administered by the Children's Bureau of the United States Department of Labor for maternal and child health and through state and local appropriations. The program of the Division of Maternal and Child Health is primarily educational. Through the facilities of the State Board of Health, a one year survey of all births in the state is planned. As there are only approximately 10,000 births each year in Montana, it is reasonable to assume that statistical data can be obtained for a high percentage of these births. It is only by a study of all births that we may arrive at any conclusion in regard to the problems of maternal care in Montana.

Each woman in the child bearing age should be aware of the importance of good medical care throughout pregnancy. But even before this, each individual should, through a widespread health education program, realize the importance of good health. Adequate care during the pregnancy, labor and puerperium will prevent a large number of maternal and infant deaths. The individual must be educated to demand good care during this period. It is equally important that the husband be educated. Approximately 25 per cent of the expectant mothers in Montana receive a monthly letter from the State Board of Health advising them about their care. These letters are sent on request of physicians, nurses and mothers themselves.

The art and science of obstetrics must be recognized as an important division of medicine. Each graduate from a medical school should be more carefully trained in obstetrics than in surgery since practically all practitioners engage in obstetric practice whereas surgery is usually undertaken by those who have received special training. Each State Board of Medical Examiners should demand that the candidate for a license to practice medicine have adequate clinical experience in addition to a fundamental training in obstetrics. Each physician accepting obstetric patients should be prepared to render adequate care during the pregnancy, labor and puerperium.

Postgraduate courses in obstetrics and pediatrics are being planned for the coming year in Montana. A Hospital Obstetric Association is being formed through the coöperation of the Montana Hospital Association. It is the purpose of this group to study all hospital births, analyze material and hold periodic meetings to discuss the problems which arise. A study of the care of premature babies is being planned for the coming year. The district medical societies are being encouraged to form committees to study maternal and child health problems in each community. A state-wide conference on maternal and child health is being planned.

It is the plan to use every opportunity for extension of the educational program through the press, magazine articles, radio, special publications of the State Board of Health and through meetings with professional and lay groups.

Summary

The maternal and infant mortality rates in Montana have improved since 1922. It is estimated that 40 per cent of the maternal deaths are still preventable, and it is evident that the infant mortality rate can be reduced and will be materially influenced by better prenatal and natal care. A state-wide study of all births is planned for one year. Coöperation between the Maternal and Child Health Division of the Montana State Board of Health and the Montana State Medical Association in the study of the problem in Montana should point the way toward the development of a program best suited to the needs of the state and should result in reducing the maternal and infant mortality rates in future years.

NOTE—Since completion of this article, the Federal Bureau of Census has reported the official maternal mortality rate for Montana in 1938 as 3.3 per 1,000 live births. The infant mortality rate for the same period was 45.5 per 1,000 live births.

Third Trimester Bleeding

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In a recent article, Adair states that one-half the maternal deaths, one-half the infant deaths, and two-fifths of the still-births occurring in this country are preventable. It is believed that one million lives could be saved yearly by giving the expectant mother the full benefit of our present-day knowledge.

It is the purpose of this paper to discuss the diagnosis and treatment of abruptio placentae and placenta previa. The author is cognizant that it is unreasonable to attempt to follow a routine in the treatment of these cases. However, there are certain procedures which if followed in the management of these grave obstetric complications will eventuate in lowered maternal and infant mortality rates.

Incidence

Prior to 1664 all hemorrhages taking place during pregnancy were thought to be the result of premature separation of the placenta. Paul Portal in 1664 demonstrated for the first time that the placenta at times was found attached to the cervix at the internal os. It was not until 1775 that Rigby differentiated between cases of separation of the placenta above the dilating zone of the uterus and those below that zone. If the milder instances of abruptio placentae are taken into consideration, the incidence of this condition is then greater than is commonly believed. Some degree of premature placental separation occurs in about one per cent of all pregnancies. Bland states that the more severe forms of premature separation of the placenta result in a maternal mortality rate of six per cent and a fetal death rate of sixty per cent. Comparatively rare is complete separation of the normally implanted placenta. This latter complication probably occurs not oftener than once in five hundred cases.

Causes

The causes of abruptio placentae are many, including pregnancy toxemia and nephritis, abnormalities of the endometrium and ovum, and injury. Toxemic disorders of pregnancy undoubtedly bear a definite relationship to abruptio placentae from the standpoint of etiology. Thus careful attention to good ante-natal care is a preventative to the occurrence of this serious complication. Repeated studies of the ovum, placenta, and endometrium have showed, as a rule, hemorrhagic infiltration of the decidua and myometrium.

Pathology

Following separation of the placenta, hemorrhage always occurs except in unusual instances where the fetus has been dead long enough to permit the occurrence of thrombosis of the uterine sinuses. Unfortunately the hemorrhage is not always visible. At times the bleeding is concealed. Massive hemorrhage may occur with no evidence externally of any bleeding. The usual picture, however, is external hemorrhage associated with the premature separation of the placenta. Rarely uteroplacental apoplexy occurs. In this condition there is diffusion of blood under the peritoneal covering of the uterus and infiltration of blood into the uterine muscle fibers resulting in degeneration of the latter. The blood vessels in these cases show endarteritic and degenerative changes. This condition is known as a Couvelaire Uterus.

Diagnosis

Abruptio placentae usually occurs during the last trimester of pregnancy or during the course of labor. It is, however, possible for this condition to occur at anytime after the formation of the placenta. The most serious cases are generally seen during the last trimester. In-

stances of mild premature separation of the placenta during labor are common as can be easily determined by the most casual examination of the placenta after delivery. Fortunately, the milder cases occurring during the course of labor are not usually serious to mother and child.

The diagnosis of abruptio placentae is not difficult to make. The severity of the symptoms depends upon the degree of placental separation, the amount of blood lost, and the degree of shock. In the milder type occurring during pregnancy, there is usually a small amount of external hemorrhage and only slight pain that may be referred to the site of the placenta. In the more severe cases there is severe and sudden abdominal pain which is often described at first as being tearing in nature. Later the pain becomes dull in character. In many instances there is an associated nausea and vomiting with the onset of the pain. There may or may not be evidence of external bleeding. One should always bear in mind that a concealed hemorrhage of sufficient magnitude to produce shock may occur, a fact that unfortunately is too often forgotten. On examination, the uterus may be much larger than it should be for the corresponding period of gestation. It may increase in size before the examiner's eyes. The uterus in the severe type has a board-hard consistence, so that the fetal parts as a rule can not be outlined. Examination of the abdomen causes the patient pain. In some instances the uterine musculature remains soft and flabby which findings may lead the attendant to an erroneous diagnosis. In most of the severe types labor pains begin shortly after the onset of the abdominal pain.

Both mild and severe types of abruptio placentae may, and do, occur during labor, the milder forms being more often observed. The signs and symptoms are the same as for the cases which develop during pregnancy.

TREATMENT

Every obstetric case is a potential surgical emergency and a man need only encounter a case of abruptio placentae to realize this fact. It is impossible to set forth a definite procedure to be employed in the management of these cases. I know of no other complication in pregnancy which calls for such rigid individualization of each case. No single therapeutic plan is applicable to all cases.

MILDER FORMS

When these occur during pregnancy, expectant form of treatment combined with supportive measures have given us the best results as evidenced by a low maternal mortality rate. The milder forms more often occur during the course of labor and usually toward the end of labor. During the course of labor if the patient suddenly begins to bleed, one's first thought is of an abruptio placentae. Vaginal examination at this time will usually reveal whether we are dealing with abruptio placentae, low implantation of the placenta, rupture of the uterus, or cervical laceration. If the membranes are intact, they should at once be ruptured. In the event that the bleeding is due to low implantation of the placenta, this procedure will ordinarily cause the hemorrhage to cease. If the bleeding continues, one is probably dealing with abruptio placentae and one's attention should be then directed at immediate delivery especially if the bleeding is profuse and the fetal heart tones irregular. At this stage there are several procedures from which the attendant may choose. The cervix, if not completely dilated, must be enlarged by manual dilation or by lateral incisions in the cervix. Then forceps may be applied to the head in cases of cephalic presentation and delivery completed. In the event of breech presentation, extraction should be resorted to after completing cervical dilation. Gentleness should characterize all these procedures. In the past, vaginal cesarean section and internal podalic version have been advocated by some men, but for the most part these procedures have given way to the less difficult operations. Following completion of the second stage of labor, the placenta usually delivers spontaneously. If it does not, then one must resort to manual removal. This should be done gently and with every precaution exercised to guard against infection.

SEVERE FORMS

In the severe forms of abruptio placentae, it is imperative to make an immediate diagnosis and to institute immediate treatment. There is no expectant treatment in the severe forms of abruptio placentae. If we are to save the patient, we must empty the uterus, stop hemorrhage and combat blood loss and shock. That treatment which empties the uterus quickest and with the least danger to the mother is the best treatment. Again one cannot set forth a definite plan which is applicable to each and every case. Many factors must be taken into consideration such as the severity of the situation, the presence of pregnancy toxemia, the age of the fetus, the size of the pelvis, the condition of the cervix, and the environment. It is pertinent here to state that every woman who has bleeding during the last trimester should be removed to a well equipped hospital. With our present-day highways and modes of transportation, difficulty in removing a patient to the hospital is minimal. Any dangers incident with transporting to the hospital a patient with this grave complication are far outweighed by the advantages offered by a properly equipped hospital. If the patient is in shock, this must be combatted before any attempt at delivery is made. Whole blood transfusion should be given as soon as possible. Parenteral fluids must be administered if there is any delay in giving blood. Five hundred to one thousand cubic centimeters of six per cent acacia may be used intravenously. Hypertonic glucose solutions should not be given, because they draw fluid from the tissues and increase the coagulation time of the blood. One thousand to fifteen hundred cubic centimeters of a five per cent glucose solution in distilled water or normal saline may be used intravenously. External heat applied to the body is of great value in the treatment of shock and is a procedure so simple that it is often overlooked. When shock has been combatted, the attendant should then follow a carefully selected plan of treatment. It is at

this point that good judgment must be exercised if the patient is to be saved. The management of abruptio placentae has undergone some very definite changes during the past ten years. Normal and instrumental dilatation of the cervix, application of a bag, version and extraction, and high application of the forceps are not nearly as often employed in the management of these cases as they were a decade ago. The decrease in popularity of these procedures has come about because of the dangers incident with their employment and because of the increased maternal mortality. The rapid and forceful dilatation of the cervix with forceful delivery of the child cannot be too vigorously condemned. Many mothers and babies will be needlessly sacrificed if such is practiced.

If the cervix is partly opened and softened, one may complete the dilatation manually and resort to forceps and extraction or version and extraction depending upon the engagement of the head. These procedures, however, are certainly not without danger. Manual dilatation of the cervix may result in increased bleeding and add shock to the patient who already is in a precarious state. If the child is dead, one should seriously consider craniotomy, a procedure which I suspect is not utilized as often as it might be.

If the cervix is only partly opened and not effaced, the best results by far will be obtained by resorting to abdominal cesarean section. The low cervical cesarean section under local infiltration anesthesia offers the best results. Patients with severe pregnancy toxemia, especially the eclamptic, are poor candidates for abdominal delivery. In this latter group local infiltration anesthesia offers the best chance for the patient. In the less severe forms of abruptio placentae complicated by pregnancy toxemia, one should consider employing metreurysis or Braxton-Hicks version.

The gravity of the situation does not end with the delivery of the child and placenta. Postpartum hemorrhage in these cases is not uncommon. The bleeding occurs usually because of atony of the uterine musculature. Careful attention to uterine contraction will mean controlled blood loss. Pituitrin and ergonovine should be employed. The latter may be used intravenously. Pitocin rather than pituitrin should be used in the pregnancy toxemias. If delivery from below has been done and the bleeding continues, the uterus should be carefully packed. If the delivery has been via the abdominal route and bleeding continues in spite of the use of pituitrin and ergonovine, it may be necessary to resort to hysterectomy.

Throughout the management of these cases the watchword should be "save blood." Blood transfusion should be resorted to before, during, and after delivery if necessary.

CONCLUSIONS

1. If the milder forms are considered, abruptio placentae is more common than is generally supposed. It probably occurs in one per cent of cases.

2. Pregnancy toxemias have a definite causative relationship to abruptio placentae.

3. Vaginal examination should never be done in any suspected case of abruptio placentae until the patient is in a well equipped hospital and all preparations have been made for immediate operative procedures.

4. Each case of abruptio placentae must be individualized. There is no set procedure which is applicable to all cases.

5. In the mild forms, expectant treatment in conjunction with supportive measures offers the best prognosis.

6. In the severe forms, active interference is necessary in the interests of the mother.

7. Blood transfusions should be employed before, during, and after delivery if necessary.

PLACENTA PREVIA

The lower edge of the placenta must be at least ten centimeters above the internal os to be in normal position. When the lower border of the placenta lies just at the level of the isthmus uteri, it is known as low implantation of the placenta. When the placental edge just reaches the internal os it is called placenta previa marginalis. When only part of the opening of the cervix is covered by the placenta, we speak of placenta previa lateralis. When the os is completely covered by the placenta, it is known as placenta previa centralis.

Findley in a study of 21,706 cases found an incidence of one placenta previa in 159.6 cases. Holmes states that a conservative estimate is one in 1000 cases.

The cause of placenta previa is not known and therefore there is no prophylactic treatment for this condition. Greenhill has attempted to show that fetal deformities occur more frequently in placenta previa than otherwise. Murphy on the other hand has found no unusual frequency of association between placenta previa and fetal malformations.

DIAGNOSIS

Hemorrhage is the first and most constant symptom in placenta previa. The bleeding is painless. Every case of painless and causeless bleeding occurring during the last trimester should be considered placenta previa until proved otherwise. The amount of bleeding varies. It may be only slight at first or it may be very profuse. As a general rule each succeeding hemorrhage is more severe. The history of the painless bleeding is the most important diagnostic aid. The diagnosis must be confirmed by vaginal examination; but no examination should ever be done in any case of bleeding during the last trimester until the patient is in a well equipped hospital and all preparations have been made for immediate operative delivery. Alarming hemorrhage may follow the most gentle vaginal examination in these cases. Beck and Light in 71 cases of third trimester bleeding examined by X-ray were able to diagnose correctly placenta previa in 76.5 per cent of all the cases. Its absence was diagnosed correctly in 92.6 per cent of the cases. Ude, Weum, and Urner have visualized the bladder by means of radio-opaque substance and have thus been able to ascertain the relationship between the

bladder and presenting part. Prentiss and Tucker believe that air cystograms are more accurate than cystograms made with liquid media. The X-ray when used serves merely as an aid to the history and the clinical findings. The diagnosis of placenta previa is made by the history and the findings at the time of the vaginal examination. If the placenta is felt at the edge of the os, it is the marginal type. If the placenta incompletely covers the os, it is the lateral type. If the os is completely covered by the placenta, it is the central type. Placenta previa centralis can only be absolutely diagnosed when the cervix is completely dilated. The dangers to the mother and baby increase according to the degree of placenta previa.

TREATMENT

During the past ten years the management of placenta previa has changed even more than the management in cases of abruptio placentae. The change in the management of these cases has undoubtedly resulted in a better prognosis for both mother and child as evidenced by the reports in the current journals. The improved results have probably occurred because of a combination of factors such as improved operative technique, local anesthesia, early diagnosis, employment of blood transfusions, better equipped hospitals, and less untimely and needless interference. Adoption of the cesarean section has undoubtedly contributed a great deal to the decrease in the maternal mortality during the past ten years. Although the incidence of cesarean section in these cases has doubled during the past fifteen years, the maternal mortality has been more than halved.

Any woman with vaginal bleeding during the last trimester should be hospitalized at once. Absolutely no rectal or vaginal examinations should be done until all preparations have been made for immediate operative delivery whether it be from below via the vaginal route or above via the abdominal route. The importance of this cannot be too strongly emphasized. If the patient has lost much blood, she should be immediately transfused. Saline, glucose and acacia solutions should be used while waiting for a blood transfusion. Even if the patient does not require a blood transfusion at the time of admission to the hospital, blood donors should be available at a minute's notice. The watchword should be "save blood." Once the diagnosis of placenta previa has been made the pregnancy should be terminated. If the bleeding is only slight and the baby near the age of viability, one may temporize a few weeks with the hope of obtaining a viable baby. If this course is adopted, the patient should be kept in the hospital, strictly confined to bed, and watched very carefully. Preparations should be made to terminate the pregnancy if necessary on a moment's notice.

LABOR

In placenta previa of the marginal type, the bleeding occurs as a rule late in the second state. The bleeding is usually slight. The treatment consists of simple puncture of the membranes. The placenta then retracts with the lower uterine segment and the presenting part serves as a tampon. As a rule this is sufficient to stop the hemorrhage. If bleeding continues and the cervix is completely dilated, the labor should be terminated by forceps application and extraction or version and extraction.

More often, however, the case is one of hemorrhage with no dilatation of the cervix. There may or may not be labor pains. It is in this type of case that the attendant must exercise good judgment if he is to bring the mother through safely. The outcome of the case probably depends more upon the skill of the attendant than any other one factor. It is in this type of case that the management has changed so in the past fifteen years. Tamponade of the vagina and lower uterine segment is not generally used today. It is impossible to stop bleeding by this method in cases of placenta previa centralis. It is not an effective method at controlling hemorrhage in the other types of placenta previa. To tamponade the vagina is to predispose the patient to infection and thus make the case unsuitable for cesarean section if this must be resorted to later on.

Braxton-Hicks' version which was formerly employed is not much used today. It has been dropped from use largely because it is difficult to perform and because of the high maternal and infant mortality rates incident with its employment. The placental attachment to the lower uterine segment in these cases results in an extensive vascularization of the thin lower uterine walls. Thus manipulations through the birth canal, especially in the region of the lower uterine segment, are apt to result in lacerations and profuse hemorrhage thus complicating an already grave situation. Metreurysis is not utilized as frequently today as ten years ago, its use having been discouraged by the high incidence of maternal and infant deaths associated with its employment in the treatment of placenta previa. If the bag is used, it is important to remember to remove the bag from the vagina as soon as the largest diameter of the bag has passed through the cervix. If this is not done, there may be a concealed hemorrhage in the vagina behind the bag. When the bag has been expelled or removed, the presenting part will usually be found low in the pelvis and acting as a tampon. If the head is not low and the bleeding persists then it becomes necessary to resort to forceps application and extraction or version and extraction.

The Willett forceps described years ago is now gaining popularity in this country. Davis and others who have used this method in this country recommend its use. This method comes into competition particularly with Braxton-Hicks' version and metreurysis. Those who have used this method report its application relatively simple. The membranes are first ruptured. A firm grasp is then made on the fetal scalp with long volsellum-like forceps. The forceps are then attached to a cord which runs over a pulley and is attached to a one pound weight. As a rule the bleeding is brought under control and a spontaneous delivery is awaited. This method should be of value because it does not necessitate extensive manipulation in the region of the lower uterine segment. This method is applicable only in cases of

partial placenta previa. Those who have employed this method report no serious injury to the scalp of the child.

The third stage of labor may or may not be complicated. If there is little or no bleeding following the birth of the child, await the separation and delivery of the placenta. If there is more than a little bleeding from the uterus and the placenta has not delivered, a very careful manual removal must be done. Delivery of the placenta should be followed by intramuscular injection of pituitrin and ergonovine. The latter may be used intravenously. Should bleeding then continue, the uterus will require packing. In the event blood loss has been excessive the patient must be given a whole blood transfusion. Shock should be treated by methods described earlier in this paper.

Cesarean section should be resorted to in cases of placenta previa centralis unless the patient is in active labor and progressing satisfactorily with no loss of blood. Cesarean section should be employed in the previas of the partial type if the cervix is closed, or if the cervix is partially dilated and rigid. Delivery via the abdominal route obviates most of the undesirable manipulations through the lower uterine segment. As a rule there is less loss of blood when abdominal cesarean section is employed than when delivery has been accomplished via the vaginal route. In abdominal section the placenta is delivered immediately after the birth of the child and this contributes to the saving of blood. Abdominal section is not without dangers and serious complications. It appears that the incidence of infection is greater following cesarean section for placenta previa than for other obstetric complications. Only clean cases should be subjected to abdominal cesarean section. Should the case be infected, the section should be followed by hysterectomy. If troublesome bleeding occurs at the former site of placental attachment, hemostasis can usually be obtained by suturing the thin walled uterine sinuses. The low cervical cesarean operation under local infiltration anesthesia offers the best prognosis because of lessened chance for infection. In closing, let me emphasize the importance of directing one's efforts at saving blood.

Conclusions

1. Painless uterine bleeding in the last trimester of pregnancy should be considered placenta previa until proved otherwise.
2. Every effort should be made to lessen blood loss.
3. Blood transfusions should be employed before, during, and after delivery when necessary.
4. Cases of placenta previa marginalis and lateralis with the cervix effaced and the os partially dilated or completely dilated may be managed by rupture of the membranes, forceps delivery, internal podalic version or Willett forceps.
5. Abdominal cesarean section offers the best prognosis for the mother and child in cases of placenta previa centralis and in the partial previas with undilated and uneffaced cervix.

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Care of the Healthy Baby

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UNTIL recently, perhaps one of the most neglected fields of medicine was the study of the care of the normal young child. One should aim not only to preserve health but also to actively promote physical fitness and mental and emotional well-being. These provide added duties for every physician who undertakes to furnish medical care for children. It is imperative that the personal physician to the child become as well versed in the means of preserving health and preventing disease as in waging a defensive battle at the bedside when a child is sick.

Infancy, being the period of greatest immaturity and most rapid growth, is the age of highest mortality and most unusual course of disease. More babies die during the first two weeks of life than during the remaining fifty weeks of the first year; and more die during these fifty weeks than during the next four years. By the middle years of childhood the tissues have become relatively much more mature and the body is relatively much more stable; hence we expect to find, as we do, lower mortality and the more usual response to disease. Lack of immunity during early childhood accounts for the

chief contrast between diseases of this age and in adult life, namely, a high incidence and somewhat different course of many of the infectious diseases.

Regular physical inspection will go far toward preventing illness in children. During the first six months the infant should be taken to the doctor once a month; during the second six, once every two months, and thereafter at six month intervals. By this means, if physical defects appear they can be treated early.

When parents bring the child to a physician for preventive rather than for therapeutic services, the physician must take the responsibility for discovering by means of carefully elicited history what, if anything, is wrong with the child's environment, his care or his habits. One cannot over-emphasize the importance of thoroughness in obtaining the history. While the physician is talking with the parents he has an opportunity to study the child himself, his relation to his parents and his reactions and his adjustments to his environment. This should furnish the background of all his work with the child. The physician should make a complete health examination and be prepared to employ in this connection all of the available practical methods of bringing to light early or hidden abnormalities of structure or function. For example, the roentgen ray should not be regarded as something to be used as a last resort, for information obtained by it is often of great value in detecting incipient disease and structural abnormality.

An example of the need for individualized physical examination, with the appropriate laboratory, and occasional environmental, studies of the child is offered by the child who manifests only minor departures from health. These conditions are so frequently encountered they may be falsely accepted as the inevitable. The list of such conditions is long and only the exceptional child is free from any of them. They include teeth decay, chronic fatigue, frequent colds, bed wetting, nail biting, food intolerance, chronic constipation, nervousness, and many others. Each should call for investigation of the factors contributing to its occurrence and an attempt made to correct it.

One of the most common of physical defects to which children are subject is a tight or spastic anal sphincter. When the child is constipated or has difficult and painful bowel movements, the physician should look for this condition. Careful digital stretching of the anal sphincter will remedy this. This digital manipulation may have to be repeated several times to effect a cure. However, constipation is much more frequently the result of faulty habits. Children would rather play than attend to the duties of nature. In my experience the drug habit, rather than curing constipation, enhances it. The use of cathartics other than mineral oil and occasionally milk of magnesia, should be discouraged. Enuresis and diuresis are conditions which may be merely habitual or otherwise. The physician who knows the child and understands his environment can best judge as to the proper methods of correcting these habits.

The infant's complete dependence on his environment for his sustenance makes vigorous dietary supervision essential for his well-being. The child has a lower margin of safety in regard to his nutritive requirements and deprivation usually will give rise to disturbances of structure or of function which may or may not make themselves clinically apparent. Physical measurements become much more valuable if obtained at successive intervals on the same child and comparisons made as to the rate of gain. The simplest means of measuring growth in babies is by the periodic recording of weight. During infancy, in the absence of any apparent disease, a satisfactory weight gain from month to month may usually be taken as evidence of adequate feeding, good nutrition and healthy growth. A factor of safety will be added to this estimate if height is also recorded. Such measurements, however, particularly in later childhood, may not reveal the perversions of nutrition which may reflect themselves in alteration of the tissue turgor, color of the skin and mucous membranes, degree of alertness, disturbed sleep, or other signs of chronic fatigue. Dental decay and habitual constipation frequently are evidence of perverted nutrition. Resistance to infection may be greatly reduced by deficient diet. The effects of deficiency of vitamins A and C are noteworthy in this regard, and inadequacy of vitamin B under certain circumstances may exert a similar effect. The following table gives the usual developmental achievements of babies at different age levels. Variations may be found but should suggest the need for a search for some disorder.

Birth	Vigorous nursing, purposeless grasping.
2 to 4 months	Holds head up independently, notices surroundings, purposeful grasping.
5 to 9 months	One or more teeth, sits with support.
6 to 10 months	Crawls, stands with support, improved coördination.
10 to 15 months	Stands alone, walks with support, coördinated play, ± established stool habit, ± feeds self.
12 to 18 months	Says single words, walks alone, six to twelve teeth, ± established stool and urine habit.
18 to 24 months	Walks well, runs, twelve to sixteen teeth, coordination improving, says many single words, ± some phrases.

The existence of a preliminary period of difficult adjustment in the first two or three months of life has also been insufficiently emphasized in the literature. That the child needs time to adjust to the rhythmic conditions of living and the mother, in her weak and emotional state, to her new responsibilities is not sufficiently understood. Individual differences in infants, with respect, for instance, to food and sleep requirements, are too little stressed with the resultant undue anxiety on the part of those mothers whose infants deviate most from the accepted standards, even though such limits fall within normal limits of variation. Reassurance is often necessary. For instance, the average number of hours of sleep per child during the first two years is usually less than the amount recommended as desirable in the publications of the U. S. Children's Bureau. In their pamphlet entitled *Infant Care*, it is suggested that children should sleep twenty to twenty-two hours per day in the early weeks of life and fifteen hours per day at the end of the first year. Washburn and Putnam in their study of fifty-nine children found an actual average of sixteen

to seventeen hours in the early weeks of life and thirteen to fourteen hours at the end of the second year.

Mothers should receive common sense instructions concerning the wearing apparel of infants, exercise, and training to habits of regularity. The practicing physician should always be in possession of information concerning these details and should be ready, willing and anxious to answer questions propounded by mothers. It is his obligation in the care of the infant.

Physical, mental, and environmental factors are inseparably interwoven in the development of the child. Child psychology to me means applied common sense. Every child cannot be expected to follow a single pattern or flourish under the same rule of guidance. Knowledge alone never made a good parent. The parent who parcels out affection in carefully measured doses by "rule of book" is taking her responsibility too literally. Affection is a feeling that needs a spontaneous and natural expression. While affection and careful attention are essential to the child, they are often carried entirely too far. To the child's detriment, devotion frequently displaces intelligence. From the first the infant should be taught regularity. He should be fed at regular intervals and not fed between meals. He should be made comfortable in his bed and not repeatedly picked up or played with. As he grows older he should be put to bed in a dark room. He should never be frightened. A child brought up in this manner usually does not know the word "fear". For instance, when he is frightened of the doctor, what can one expect other than that he will fight, scream and cry at the doctor's visit. Every child should learn to mind from infancy. A child scratching, slapping, kicking and even at times cursing his mother is indeed a sorry sight, but I believe it is the parents' and not the child's fault.

The importance of an understanding of the emotional aspect of the feeding of infants is too little appreciated. The most important aspect of the emotional problem in infant feeding is recognition that the problem exists and to a large degree may be presented if the physician has insight and understanding of the personality of the mother and takes pains to prepare her to meet situations that are bound to occur in every case. Here, if anywhere, "an ounce of prevention is worth a pound of cure." We should pity the child who feels he is doing the family a favor by eating his spinach, who refuses his food unless mother makes a game out of eating, or father cuts antics on the floor or makes a monkey out of himself in some other manner. If the situation has not progressed too far and such a child is removed from his home environment he will soon eat a sufficient quantity and without coercion. In such cases it isn't the child, but the family who needs treatment. A child can be made a pleasure or he can be made the greatest little pest in the world, and whichever he turns out to be depends largely upon the parents.

In plain English, the child should be fed; he should be required to rest—not necessarily sleep—at regular hours; he should be given an adequate amount of affection so that he knows that those around him love him; he should be taught to mind and should not be shown too much attention. One rarely sees a child thus trained who must be forced to eat, for he takes his food as a matter of course. He is taught that things given him are good for him and he never has any other idea.

Our obligations in caring for the infant cannot be regarded as being fulfilled until we have at least immunized the child against diphtheria and smallpox. It should be remembered that the natural immunity against most communicable diseases usually terminates about the sixth month of life. Certain of the contagious diseases of childhood are much more serious if they occur when the child is under five years, and particularly if they occur under one year, than if they are delayed until after five years, or better still after ten. Hence the physician should be particularly careful to keep young children from coming into contact with these diseases and particularly watchful when they do occur. At the present time one of the best means of actively immunizing an infant against diphtheria is by the administration of two 1 cc. doses of diphtheria toxoid. The second dose follows the first after an interval of three weeks. Alum precipitated toxoid, if used, should be given in two doses of 1 cc. each. The best time to immunize a child to diphtheria is between the sixth and ninth months of life. For children over two years one should start with 0.5 cc., or less for the initial dose, because of the possible danger of obtaining a severe reaction. In the event of a reaction to the first small dose the same dose should be repeated on the next visit. According to statistics, alum precipitated toxoid has a slightly higher effectiveness in producing immunity but the reactions with it are frequently more severe. One should not fail to do a Schick test six months after the immunization. A positive reaction calls for a second series of toxoid.

Every child should be vaccinated against smallpox during the first year of life, a good time is at six months of age. In early vaccination the reaction is less severe and complications are less likely to occur. Most cases of vaccinal encephalitis occur in connection with a primary vaccination at a later age. The multiple pressure technic is now preferred to the old "cross-hatch scratch method." The intracutaneous method using River's vaccine is particularly useful when children with skin diseases require vaccination.

In certain localities a preventive measure which is not needed as a general procedure elsewhere may be called for routinely, as in the case of typhoid vaccination where typhoid fever is prevalent. In the case of very young children other specific measures like convalescent serum should not be overlooked merely because they are not suitable for use with all children. In regard to protection against measles the physician must exercise his best judgment in connection with the individual child. Measles is peculiar in that there is nearly complete immunity until after the fifth month, that it is relatively mild in the latter part of the first year, more severe in the second and third year, less dangerous in later childhood, and again, if one may trust statistics, more severe in adult life. While measles is not, as a rule, a very seri-

ous disease, in private practice in a healthy child of a favorable age, it is nevertheless a treacherous disease with potentially serious complications and sequelae and the use of serum, especially convalescent serum, offers a valuable therapeutic procedure that may well be used extensively. Four to 10 cc. of convalescent serum or 2 cc. to 6 cc. of placental extract will prevent or modify the disease, depending upon the dosage and the time after exposure that the serum is given.

Whooping cough is a very serious and often fatal disease in infancy and in those who are debilitated. Vaccination against whooping cough is now being advocated as one of the routine immunizations. The most popular and probably the best method is with the use of the Sauer double strength vaccine, or a vaccine made in a similar manner. This is administered in the second half of the first year, preferably at the seventh or eighth month of life, at which time the infant's power to develop immune bodies is said to reach a maximum. The vaccine is given subcutaneously at weekly intervals, in three doses of 1 cc., 1.5 cc., and 1.5 cc., a total of 80,000 million killed H. pertussis bacteria being given. About 70 per cent of all nonimmunized children exposed to pertussis will contract the disease. If parental serum, obtained from parents who give a definite history of having had pertussis is given early in the incubation period to exposed children the disease will be prevented in 60 per cent, and in the remaining 40 per cent the disease will be distinctly milder. If convalescent serum is obtainable it should be used, for about 85 per cent of exposed children will be protected and the remainder will run extremely mild courses. Twenty to 40 cc. of the parental serum should be given intramuscularly, or 10 cc. to 20 cc. of convalescent serum; the dosage depending upon the patient's age and the time elapsed since his first exposure to the disease.

There is still much discussion as to whether it is advisable to immunize a child to scarlet fever. Active immunization through three injections of increasing doses of scarlet fever streptococcus toxin, weekly for five weeks, is of value but the reactions obtained are often so severe that one hesitates to recommend the procedure. Furthermore, the degree and duration of immunity obtained have not been definitely established. If such a procedure is contemplated the Dick test for susceptibility to scarlet fever should first be given. The disease can usually be prevented in an exposed child by the intramuscular injection of 10 cc. of convalescent scarlet fever serum. Fifteen to 20 cc. should be given for older children. Such a passive immunity has a usual duration of about two or three weeks, and prevents the disease in 97 per cent of all children receiving the serum.

Chickenpox is a relatively mild infection and so contagious that it is a question whether it is worth while to avoid its spread to other children in a family. In the rare case in which it is desirable to protect a particular child from this disease, immune serum or placental extract may be employed, but only with fair success.

Mumps is almost unknown during the first year of life. It is a relatively mild, uncomplicated disease during early childhood. Our chief concern should be for the father.

Childhood infection with tuberculosis takes place much more frequently than it should. Tuberculosis of bovine origin is the direct result in every instance of the failure to observe simple, known, sure protective measures. Raw milk and milk products are the only sources from which this infection takes place. Boiling the milk and using foods made only from pasteurized milk will effectively eliminate bovine tuberculous infections in children. The only way in which infection of children with tuberculosis of human origin can be controlled is by preventing children from being exposed to persons with open tuberculosis.

In conclusion, I should like to emphasize that the health of the child is the responsibility of the family physician and not of the health agencies. If matters of routine health examinations, immunization procedures, and other affairs of preventive medicine are usurped by the schools and other agencies, the breach between the people and the practitioner of medicine will be widened and a false separation between matters of health maintenance and of treatment of disease will be made. As a consequence, all parties will suffer. The desirable type of individualized periodic health examination can best be obtained through the family physician. Ideally, the child should be under periodic observation of such a physician from the time of its birth; problems can then be met before they arise. The hazards of disease can be markedly lessened through the institution of immunizing procedures before the child has completed his first year of life, and through the wise supervision of his nutrition and his habit formation throughout his formative period much more will be accomplished than by the management of such procedures by health agencies or as a prelude to school attendance.

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Injuries to the Newborn

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INJURIES at birth are usually quite easy to recognize if time is taken to completely examine the child. Usually the obstetrician is aware that such an injury has taken place; however, during the stress of a difficult delivery these injuries may be overlooked and recognized only after a complete check of the infant. Even in an apparently normal delivery such an accident may arise, so it is well to be sure that nothing is overlooked.

Skull depression is a trough-like depression involving either the posterior parietal or the frontal bone. It is caused by pressure of the head against the promontory of the sacrum and is found only after a difficult labor. Symptoms, however, are generally absent unless there is a considerable pressure resulting from the depression. The depression, if not severe, usually corrects itself unless accompanied by a fracture of the internal or external table of the skull. One may sometimes reduce those which do not reduce spontaneously by pressure exerted opposite the depression. In the frontal area it is necessary to cut down to the bone, insert a bone screw and lift the depressed area.

When fractures of the spine occur, they are as a rule, the result of a difficult delivery of the after-coming head. The sixth cervical vertebra is usually involved and is accompanied by massive hemorrhage into the spinal canal, which injury generally results in death.

Fracture of the clavicle is the most common of all fractures and is often overlooked until one notes a small mass of callus formation at the point of fracture, occurring most frequently at breech presentations, caused by pressure of the fingers over the clavicle. In vertex positions, the width of the shoulders is probably the deciding factor. Examination of a suspected fracture may go unrecognized until callus formation has taken place and the accompanying enlargement noted. The condition may be suspected if the Moro reaction is employed and the affected arm does not rise to complete the encircling response of the opposite arm. X-ray will always confirm the diagnosis. It is to be distinguished from brachial birth palsy and fracture of the humerus.

Humerus fractures, when occurring, accompany breech delivery, where an arm is brought down over the face, or may follow version followed by extraction, and, occasionally, they are said to be due to pressure of the humerus against the sacral promontory. Injury to the musculo-spiral nerve may result from such a fracture.

Fractures of the forearm are rare, as are those of the femur which are even more rare and are usually the result of version and extraction, or of the manipulation of the infant during delivery by cesarean section. The leg is extended vertically as in the treatment of fractures of children.

Birth injuries of the eye are, with few exceptions, due to the pressure of the forceps directly over the eye, or indirectly due to the compression of the skull. Fracture of the orbital bones may not cause symptoms but may be accompanied by ocular palsies. Exophthalmus may result from homorrhage behind the globus. Rarely does such a hemorrhage cause atrophy of the optic nerve. Opacities, caused by an edema of the cornea, disappear shortly whereas opacities, caused by a ruptured cornea, are permanent. Hemorrhage may take place in the various anatomical portions of the eye without lasting damage. Retinal hemorrhage is not of serious consequence.

Caput Succeedaneum is an area of edematous swelling, usually located over the parietal and occipital regions of the head, but also located at times over other parts of the body. It is the result of the contractions and relaxations of the uterus and occurs over the part presenting at the cervix. It is formed by the infiltration of lymph and sometimes blood from lymph and venous stasis. Swelling of the genitalia in breech presentations and edema of a presenting arm or leg are corresponding conditions. Treatment is unnecessary unless infections result, wich rarely occurs.

In cephalematoma there is a hematoma formation beneath the periosteum, which is usually external but may be internal, in which instance the blood is between the dura mater and the bone and is much more rare than the afore-mentioned condition. The mechanism of formation is much the same. It is much oftener seen in the first child and in difficult labors. During the first few days, the swelling is firm and becomes soft in a day or so, and an irregular margin, due to the deposit of lime salts, develops at the base. Usually the condition has cleared by the time of discharge from the hospital. It can be distinguished from caput succeedaneum, in that it will go up to a suture line, but will not cross. It may occasionally have to be distinguished from cephalocele or meningocele, in which conditions the tumor lies over a suture line. On occasion, the tumor mass enlarges in the presence of a hemorrhagic disease, but ordinarily the outcome is favorable. Bone cyst has been reported following this condition.

Hematoma of the sterno-cleido mastoid muscle is most frequently seen following breech presentations and is usually unilateral. It is first noted several days following delivery. The swelling is hard and is not freely movable, and the infant will favor this side of the neck and object to movements of the head. It is not thought to cause wry neck of a permanent character. As a rule the mass absorbs over a period of several weeks so that no treatment is necessary. It is sometimes confused with an adenitis.

Facial paralysis is the most common of the peripheral nerve paralyses. Obstetrical paralysis, resulting from forceps delivery, is due either to direct pressure on the nerve as it leaves the facial canal or to trauma, swelling

or hemorrhage in this area. It is usually unilateral and is always peripheral. The face on this side is smooth, there is no wrinkling of the forehead, there is partial closure of the eyelids, the corner of the mouth droops and the naso-labial fold is absent or obliterated. The condition is exaggerated when the child cries. This type of paralysis is transient in nature and usually disappears in a few days. The condition needs no treatment other than is directed to bruising and swelling. If the nerve is cut, the paralysis is permanent. In those cases where severing of the nerve has occurred, suturing the nerve, after waiting several months to see if spontaneous recovery does not take place, has resulted in some cures.

Rarely does the facial nerve become involved as a result of a central lesion, caused by a skull fracture or hemorrhage resulting from forceps delivery. However, when it does occur, wrinkling of the forehead is not involved, although other muscle groups usually are, where such a lesion takes place.

Obstetric paralysis due to inherent pressure factors may be divided into two groups, those due to antepartum compression and those due to intrapartum compression. The latter nearly corresponds to the type known as forceps trauma, but the injury is due to the pressure of the head against the bony prominences of the pelvis. It occurs in prolonged labor where the baby is large or the pelvis abnormal. It is likewise due to direct injury of the nerve, or the result of hemorrhage or edema. Recovery often occurs. Antepartum compression paralysis is due to the abnormal position of the fetus in relation to its own parts, or to non-yielding surfaces of the mother. Cranial and facial asymmetry accompanies the paralysis. The skin on the involved side is thin; the temporal, the parietal areas, and the lower jaw are flattened; the ears depressed. This is a peripheral type of nerve lesion, and the outlook for nerve recovery is unfavorable. Usually the pressure, resulting in complete atrophy of the nerve, has existed for some time.

Spontaneous or non-obstetric paralysis may be unilateral or bilateral. The cause of this type is not well understood, but is thought to be due to nuclear agenesis. Consequently the chance of spontaneous recovery or successful treatment is very poor.

Brachial birth palsy, with the exception of facial palsy, is the most common of the peripheral nerve injuries. It is caused by direct trauma to the brachial plexus, due to over-stretching. It may result from the delivery of the after-coming head, where traction has been made on the shoulders with the index fingers over the brachial plexus. It may be the result of an arm slipping over the head, thereby putting the tension on the brachial plexus, where it comes under the clavicle. Sometimes it is due to pressure on the lower portion of the neck and shoulder during labor if the pressure is prolonged. The nerves may be injured through overstretching or may be severed at their trunk. This condition is most often found in forceps and breech deliveries.

Two types of brachial nerve palsy are recognized. The most common type is known as Duchenne-Erb paralysis. The upper arm is involved and usually the right arm. It is seldom bilateral. Injury to the fifth and sixth cervical roots, or the trunk formed by them, causes this syndrome. The muscles usually involved are: the deltoid, supra spinatus, infra spinatus, teres minor, biceps, supinator longus, and occasionally, the seratus magnus and coraco brachialis. The arm is limp, is extended and inwardly rotated, with the shoulder depressed. The child cannot abduct, elevate, outwardly rotate or supinate the arm. Klumpke's paralysis is the lower arm type and is much less frequent. This involves the seventh and eighth cervical and the first thoracic nerves or the trunk formed by their union. It is the result of breech or face presentations. The muscles involved are those enervated by the ulnar and median nerves. The paralysis affects the small muscles of the hand, some muscles of the forearm and the triceps. The hand is flail-like, and the grip is lost. The lower arm is flexed on the upper arm. Sensation is more impaired in this than in the upper arm type. Oculopupillary symptoms, namely the narrowing of the palpebral fissure and contraction of the pupil, are present when the sympathetic fibres in the first thoracic nerve are involved. In addition to these two palsies, the entire arm may be involved, also mixed forms have been reported, as well as involvements of single muscles.

These cases are to be differentiated from other palsies resulting from birth injuries of the cranial type, fracture of the clavicle or humerus, and dislocations which may simulate obstetrical palsy.

The possibility of this type of obstetrical paralysis should be recognized in all difficult labors and especially in breech deliveries and exceptional care taken to avoid them where possible. When the paralysis has taken place, the arm should be put at absolute rest and in a position so that the brachial plexus will not be under tension. Several weeks are usually required for recovery. If no recovery has taken place over a period of a year, operative interference may be attempted. Many of these fail, so one's hopes should not be too high; however, in a few instances, the results are satisfactory, which makes the effort worth while.

Paralysis of the phrenic nerve is a rare type of palsy, and occurs usually with an accompanying injury to the brachial plexus, of the lower arm type, since the phrenic nerve comes off the third, fourth, and fifth cervical nerves. This paralysis appears within twenty-four hours after delivery and is associated with respiratory difficulty, resulting in cyanosis and rapid breathing. The breathing is of the thoracic type, in contrast to the usual abdominal variety found in infants. The diagnosis is aided by fluoroscopic examination where a see-saw movement of the diaphragm is noted, as well as a to-and-fro movement of the mediastinal content.

The condition is to be differentiated from congenital heart disease, intracranial hemorrhage, atelectasis, and diaphragmatic hernia. These can be ruled out by using the fluoroscope and by noting the usual accompanying brachial plexus palsy.

Lumbar palsy, with its involvement of the lower extremities, is rare, and usually follows traction on the legs

during breech deliveries. It is not to be confused with hemorrhage into the lower portion of the spine.

Injuries to the internal organs are recognized, and practically all are the seat of a congestion due to venous stagnation, during contraction and relaxation of the uterus. Where asphyxia is great, petechial hemorrhage may occur. Major injuries are somewhat rare, and when occurring involve the spleen, liver, suprarenals, and intestines.

Suprarenal hemorrhage of the newborn occurs as a result of birth trauma, rough handling during resuscitation, and undoubtedly, in some instances, as a result of hemorrhagic disease. The main symptoms upon which one may base a diagnosis are rapid respiration and high temperature in the presence of normal lung findings. Other symptoms may be present, such as convulsions, petechiae on skin or mucous membranes, jaundice and abdominal symptoms. Injury of a slight nature may not cause a rise in temperature. The finding of a mass, unilateral or bilateral, is confirmatory evidence. Complete destruction of both glands may result in collapse, a subnormal temperature and sudden death. A low blood sugar, the result of medullary involvement, may aid in making a diagnosis. Recovery can take place where unilateral hemorrhage has occurred or where the injury to the glands is not too severe.

Reports of peritonitis following perforation of the intestine in newborn infants are not infrequent in medical literature. Some cases are even listed in which the injury has occurred during intrauterine life. Rupture, however, ordinarily takes place during delivery. The usual site of rupture is the colon and most frequently the sigmoid portion, due evidently to its long mesentery. However, rupture has been reported to occur in the stomach, duodenum and small bowel. As to the etiology being usually due to abnormal intestinal membrane angulations, peritoneal pockets and other abnormalities of the gastro-intestinal tract, autopsy has revealed only one-third of the cases presenting such abnormalities. Rupture of a normal bowel, as a result of trauma during passage through the birth canal, is not generally accepted. Rapid distention of the abdomen is the most early finding, plus other symptoms of a general peritonitis later. Prognosis is uniformly bad, treatment is limited to surgical repair, and measures to combat infection.

Injury to the mouth may occur as the result of the application of forceps. The rectum may also be injured in breech presentation when it is mistaken for an undilated cervix. In rare instances there is dilatation of the hemorrhoidal veins at the time of birth, and simulate the hemorrhoids of later life.

Rupture of the liver and spleen have been noted and occur most often with breech deliveries.

Lesions of the spinal cord are largely the result of trauma occurring during breech extractions and are nearly always severe. Complete severance of the cord may occur and these children are born dead. Death occurs early in those that survive because of a paralysis of the urinary bladder and the resultant infection. Paralysis involves the lower extremities and frequently the muscles higher up in the trunk, depending on whether the lesion is low or high up in the cord.

From the standpoint of death rate, physical, and mental crippling in later life, intracranial injuries at this period of life are the most important of the entire group of injuries to the newborn. Diagnosis of this condition in many instances is not so readily made as one might be led to believe.

Symptoms which are of the greatest significance are those which indicate involvement of the nervous system. Convulsions, of course, are the outstanding example of such involvement and may be general or local. They usually start out as twitchings and become worse as more and more muscles are involved, finally becoming generalized into a convulsive seizure. The convulsion may be either tonic, clonic, or both. All convulsions occurring at this age are not the result of intracranial injury, but may also result from meningeal irritations or even edema. Somnolence may be a symptom, but can only be interpreted as such if it becomes deeper and finally results in coma.

The physical findings are of more significance than just the symptoms. In severe cases of injury, the children show a peculiar pallor which is often associated with cyanosis, most frequently noted in the lips. As the condition becomes worse, the cyanosis becomes more generalized.

Newborn children do not perspire under normal conditions, so that the presence of perspiration, which is rarely seen, is considered to be evidence of cortical involvement. The skin more often is cold and clammy; or, in the presence of fever, hot and dry. The heart rate is rapid at first, but if hemorrhage continues with increased intracranial pressure, it becomes slowed. The respirations are usually altered and follow the heart. Examination of the nervous system reveals few and inconclusive findings. Rigidity is found where there has been a large hemorrhage at the base of the brain with flow into the spinal canal. Rigidity at this age is hard to interpret unless it is very marked because the muscles are less pliable at this age than during later months, and, even then, with a child working against one, difficult to evaluate. Stiffness, which is of the greatest significance, is that which involves the muscles of the back, often producing a certain amount of opisthotonos. Flaccidity, when it occurs, is taken to be a bad sign.

A tense fontanelle is important, but a bulging fontanelle is of still more significance; however, it rarely occurs in intracranial hemorrhage. Eye symptoms frequently occur, and evidence of dilatation and contractions of the pupils and deviations similar to strabismus are present in severe cases. Examination of the eye grounds reveals little if anything of diagnostic importance.

As a diagnostic procedure, spinal puncture, or, better still, cisternal puncture with proper interpretation of the findings, is of definite value. In cisternal punctures, one is less likely to injure or puncture a vessel, thereby drawing blood. The presence of blood in the spinal canal fluid should not lead one to immediately conclude that

it is from an intracranial hemorrhage, because more than likely it will be there as a result of faulty technique in doing a spinal tap. However, if the blood is mixed with large amounts of spinal fluid and the individual cells are macerated or disintegrated, one may conclude that one is dealing with an intracranial hemorrhage, providing that no previous attempts at puncture have been made. The finding of a xanthrochromatic fluid in a non-icteric child, four or five days after birth, is strong evidence for believing such a hemorrhage has taken place. Centrifuging of the spinal fluid, where there is presence of an intracranial hemorrhage will nearly always show some discoloration of the spinal fluid, and the cells will always show some disintegration. When the fluid is clear and the cells show no evidence of disintegration, one can be sure that one's technique in doing the puncture was at fault.

Increase in spinal fluid pressure is to be found in nearly all cases of intracranial hemorrhage.

As to treatment, little can be done, after the hemorrhage has taken place. Rest and absolute quiet are of first importance. Manipulation at this time will often cause further hemorrhage with disastrous results. The use of substances to increase the coagulability of the blood are indicated because of the lessened ability of the blood to do so during the first days of life. The injection of whole blood intramuscularly is recommended, and it efficaciousness declared by some but denied by others. Whether the newer blood coagulants, vitamin K, etc., will be of much benefit is yet to be seen.

Relief of pressure may be attempted by means of the various punctures, lumbar, ventricular, and cisterna, but keeping in mind that the removal of the pressure may bring about further hemorrhage.

Where convulsions occur sedatives are used: chloral hydrate, phenobarbital and ether, or chloroform, if the convulsions are severe. Morphine, when carefully used, may be resorted to, in doses of 1/100 or even 1/200 of a grain hypodermically.

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The Use of Elimination Diets in Allergy of Childhood*

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WHEN symptoms of probable food allergy are not controlled by diets which exclude foods to which skin reactions have occurred, elimination diets should be used to determine clinical allergy. Less than 50 per cent of the patients that are allergic to certain foods give positive skin reactions to those foods. The best way to control food allergy is by eliminating the offending food or foods from the diet.

In planning an elimination diet consider the following:

1. Eliminate the foods to which a patient gives positive skin reactions or a positive history.
2. *Diet should contain foods to which patients are* infrequently sensitive as determined on the basis of skin reactions and histories of food dislikes and disagreements checked by diet trial. The leading causes of allergy according to this list, in the order given, are wheat, eggs, milk, chocolate, tomatoes and potatoes.
3. Include as few foods as possible and yet prepare balanced meals with sufficient caloric intake and the maintenance of carbohydrate, protein, mineral and vitamins. These requirements will differ according to age. A child's diet will have to contain larger quantities of protein, vitamins, and minerals due to the growth factor.

A single sensitization to a food may occur, but usually sensitizations to many allergens of the same type and occasionally of various types exists. Practically all proteins are allergenic. One outstanding exception is gelatin.

Many times in children there is a correlation between dislikes in food and actual allergy. Such dislikes are at times the result of past experience that the foods produce disagreeable symptoms. Therefore, this must be

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taken into consideration when planning an elimination diet.

Each basic elimination diet should include:

1. One or two carbohydrates.
2. One or two protein foods.
3. Two or three vegetables.
4. One or two fruits.
5. Some oil and sugar.

The carbohydrates commonly included are rice, corn, rye, barley, tapioca, sage and sweet potato. Wheat allergy is more frequently encountered than any other food allergy, probably due to the large amount of bread and other wheat products which are eaten by the American people. Next to wheat, oats, corn and rice have given the greatest number of reactions.

Some protein foods must be included. Egg holds second place to wheat as a cause of food allergy. Therefore, egg will be eliminated from the basic trial diet. As to meats and fish, pork probably produces allergic reactions more frequently than other meats and beef produces more allergy than lamb. In fact, lamb and chicken sensitization is infrequent. Sensitization to fish, especially shellfish, is more common than to meats. Crab, shrimp and lobster are the most potent allergens. White fish and salmon on the other hand can be added to some elimination diets.

Milk is a very common allergen and therefore would be eliminated in a basic allergy diet. Diets do not have to contain milk to meet the requirements of health as long as the deficiency is taken care of in another way. The carbohydrate, protein, and fat content of the diet is easily maintained without milk. The main deficiency will be found in the calcium and phosphorus content of the diet. Milk substitutes which have been offered for feeding the infant and child sometimes are very satisfactory. The following may be considered.

1. Cemac is a liquid preparation made by Mead, Johnson and Co. It contains beef, cauliflower, tomatoes, carrots, spinach, dextri-maltose, olive oil, gelatin, dicalcium phosphate and sodium acid phosphate. The large number of ingredients prevents the use of this preparation in all cases of milk allergy when other sensitivities exist.
2. Sobee is also prepared by Mead, Johnson and Co. It consists of soybean flour, olive oil, arrowroot starch, dextri-maltose, sodium chloride, and dicalcium acid phosphate.
3. Mull-Soy is offered by the Muller Laboratories of Baltimore. It contains soybean flour, soybean oil, dextrose, sucrose, calcium phosphate, calcium carbonate, sodium chloride, vitamins A and D concentrated from fish liver oil. It is a liquid preparation which is well tolerated by infants and young children.

Vegetables make up an important part of the elimination diet. Allergy to specific vegetables exists and reactions to various vegetables are not infrequent. Cabbage, cauliflower, the legumes, white potato, celery and tomato cause allergy most frequently. Carrots, squash and lettuce produce little allergy.

Fruits are frequent causes of allergic disturbances. Usually specific allergies exist to individual fruits, although closely related ones produce trouble in certain children, such as all citrus fruits and all pit fruits. As a general rule, fresh fruit will cause symptoms much more frequently than cooked or canned fruit. Therefore all fruits on a trial diet should be cooked with the possible exception of the citrus fruits. Oranges, grapefruit, apples, bananas and strawberries probably produce the most allergy. Melons and other berries come next. Peaches and apricots rarely cause allergy.

Honey frequently produces allergic gastro-intestinal disturbances. A few cases of allergy to cane sugar have been reported, but most children tolerate beet sugar. There is little or no evidence of allergy due to syrup or dextri-maltose. Allergic disorders from the ingestion of tapioca and sage, which are carbohydrates derived from roots, are very rare. As to the oils, olive oil may produce symptoms at times but usually it is a good oil to use in an elimination diet. Exclusion of cottonseed and corn oil from the diet has been necessary in some cases in spite of recent reports that these oils are not allergens.

Nuts give a rather marked allergic reaction, the most common offenders being peanut, almond, brazil nut and coconut. They are not included in trial diets.

Spices and condiments include pepper, to which many individuals are sensitive. Paprika, green, red or black pepper all act alike. Mustard has caused allergic reactions in children. Cinnamon, sage, dill and vanilla have also been reported. Spices are not permitted in an elimination diet until effects are determined after symptoms are under control.

Beverages exclude chocolate because of frequent sensitization to it. Coffee and tea may cause allergic reactions. All soft drinks should be eliminated until one is absolutely sure of their contents.

Table I indicates clearly the foods which should and should not be used in setting up a basic elimination diet while table II reveals the source of various minerals and vitamins in the ordinary unrestricted American diet. However, in the elimination diet non-allergic substitutes must be used to supply the deficiencies which exist. These substitutes are listed in table II.

For the sake of clearness and for economy of space sample diets for a child seven years old are presented as follows.

Foods included in the diet:

Cereals—rye and corn.
Meats—lamb and bacon.
Vegetables—asparagus and beets.
Fruits—apricots and pineapple.
Fats—olive oil, corn oil, and the fat from the meats.

In addition, there are the foods allowed on any allergic diet. They are tapioca, sage, unflavored gelatin, baking soda, cream of tartar, egg free baking powder, refined and brown sugar, molasses, syrup, salt, white vinegar.

Two sample menus can easily be prepared from the foods listed.

TABLE I.
STRONG AND WEAK FOOD ALLERGENS IN CHILDREN

Cereals (carbohydrate)	Meats and Fish (protein)	Vegetables	Fruit	Miscellaneous	
Foods which often produce allergic manifestations					
wheat	egg	cabbage	orange	honey	pepper
oats	milk	cauliflower	grapefruit	cottonseed oil	cinnamon
rice	pork	legumes	apple	chocolate	sage
cottonseed flour	beef	white potato	banana	tea	dill
	crab	celery	strawberries	coffee	vanilla
	shrimp	tomato	melons		peanuts
	lobster		other berries		almond
					Brazil nut
					coconut
Foods which seldom cause allergic symptoms					
corn	gelatin	carrot	peaches	refined sugar	tapioca
barley	lamb	squash	apricot	brown sugar	sago
rye	chicken	lettuce	plum	dextri maltose	olive oil
soybean flour	white fish	asparagus	prune	syrup	corn oil
Lima bean flour	salmon	beet		molasses	
arrowroot starch		spinach			

TABLE II.
MINERAL AND VITAMIN CHART

Calcium	Phosphorus	Iron	Vitamin A	Vitamin B	Vitamin C	Vitamin D
Good sources in an unrestricted diet						
milk	milk	meat	egg	whole grain cereals	citrus fruits	fish oils
milk products	eggs	egg yolk	milk	milk	vegetables	irradiated foods
egg yolk	cereal (whole grain)	whole grain cereals	milk products	meat		butter
asparagus		asparagus	fish	asparagus		cream
beans		beans	carrots	peas		egg yolk
cauliflower		cauliflower	spinach	spinach		
		celery	asparagus	apricots		
		lettuce	cabbage	apples		
		spinach	celery			
		apricots	lettuce			
		dates	apricots			
		raisins	bananas			
Preparations available for an elimination diet						
Calcium lactate or gluconate	Dicalcium phosphate	Ferric ammonium citrate	Carotene (provitamin A) in cottonseed oil	White's Vitamin B Complex (liquid)	Cevitamic (ascorbic) Acid	Viosterol in Oil—Irradiated or A R P. I * Process
Effervescent calcium gluconate	D C P. wafers	Iron pyrophosphate (Cofron Tablets)	5 to 10 drops each day	5 to 10 drops before each meal	25 mgm Tablets	Drisdol
One to two teaspoonfuls three times a day	Dulcet bar (5 segments)	One to two tablets per day		White's Vitamin B Concentrated Tablets	One tablet 2 or 3 times a day	White's Cod Liver Oil Concentrate
	One to three wafers or bars per day			Kapseal Combex		Percomorphum Oil (50%)
				One or two tablets with each meal		Standard Doses

*Ergosterol activated by action of low speed electrons

DIET I

Breakfast:

Pineapple juice—1 cup.
Cream of rye—⅔ cup with one tablespoonful of syrup.
Bacon—3 slices.
Corn bread—1 slice.
Apricot jam—2 teaspoonfuls.

Lunch:

Lamb chops—2 small ones.
Asparagus—3 ounces (by weight).
Ry-krisp—one piece.
Pineapple salad—1 slice with 2 tablespoonfuls of French dressing, made with corn oil and white vinegar.
Apricot tapioca—½ cup, made with apricot juice and sugar.

Dinner:

Lamb patties—3 ounces (by weight).
Beets—3 ounces (by weight).
Asparagus salad—3 ounces with 1 tablespoonful of French dressing.
Corn bread—1 slice.
Cornstarch pudding made with 1 slice of pineapple, sugar, and pineapple juice.
Apricot juice—1 cup.

DIET II.

Breakfast:

Apricot sauce—⅓ cup.
Cornmeal cereal—⅓ cup with two tablespoonfuls of syrup.
Bacon—3 slices.
Rye (100 per cent) bread toast—1 slice.
Pineapple jam—1 tablespoonful.

Lunch:

Roast lamb—3 ounces (by weight).
Harvard beets—3 ounces (with cornstarch, sugar, and vinegar).
Ry-krisp—1 piece.
Asparagus salad—3 ounces (with the special French dressing).
Apricot cornstarch pudding (no egg or milk).
Pineapple juice—1 cup.

Dinner:

Lamb broth with 2 ounces of diced lamb and 1 ounce of asparagus.
Apricot salad—2 ounces with 2 tablespoonfuls of special French dressing.
Bacon cornmeal muffins (no egg or milk).
Pineapple gelatin made by flavoring gelatin with sugar and pineapple juice.

These diets yield the following caloric, mineral and vitamin values.

	Diet I	Diet II
Caloric intake	2075	1979
Carbohydrate	220 grams	222 grams
Protein	62 "	59 "
Fat	105 "	95 "
Calcium	0.165 grams	0.164 grams
Phosphorus	0.8126 "	0.524 "
Iron	0.0148 "	0.0083 "
Vitamins	Deficiency in all vitamins	

The growing child must have a sufficient number of calories, an adequate amount of protein, and plenty of the minerals and essential vitamins. On the basis of 30 calories per pound of body weight the diets offered in this communication yield enough calories for a seven year old boy of average weight and height. The protein intake is adequate since only one gram of protein is required for each pound of body weight. The absence of milk makes it often necessary to include a protein food in the basic trial diet three times a day.

The mineral and vitamin requirements for the child are approximately as follows. Active research in this field at the present time may lead to frequent changes in the figures.

Calcium—one gram per day.
Phosphorus—one gram per day.
Iron—.015 gram per day.
Vitamin A—4000 to 6000 International units.
Vitamin B—200 to 500 International units.
Vitamin C—1000 to 1500 International units.
Vitamin D—625 International units.

The omission of milk, milk products and egg yolk causes the basic elimination diet to be deficient in calcium. Beans, cauliflower and asparagus can furnish calcium, but the latter vegetable is the only one used. Therefore, calcium gluconate or lactate are often added to the diet. A palatable form of calcium gluconate is that prepared by Flint, Eaton and Co. (Decatur, Illinois) and called Effervescent Calcium Gluconate. One to two teaspoonfuls may be placed in any fruit juice and given three times a day with each meal.

Phosphorus is also very low in the diet because of the absence of milk, eggs, and some cereals. To meet this deficiency, dicalcium phosphate is employed. Most popular with children are the D. C. P. wafers of Parke, Davis and Co. or the Dulcet-bars (5 segments) of Abbott Laboratories. The preparations can be obtained flavored with mint or chocolate. One to three wafers or bars are used each day.

Iron seems to be taken care of fairly well in the basic trial diets since it is found in the cereals, meats, vegetables and fruits. However, ferric ammonium citrate is ordered by some physicians. Iron pyrophosphate can be administered by employing the Cofron Tablets (soluble) of Abbott Laboratories. These tablets consist of soluble iron pyrophosphate and copper sulphate (U.S.P.). A tablet is dissolved in fruit juice and given once or twice a day.

As to the vitamins, first consideration must be given to vitamin A. Eliminating egg, milk, milk products, fish, fish oils, and many of the vegetables reduces the vitamin A intake markedly. Carotene (pro-vitamin A) in cottonseed oil offered by the S.M.A. Corporation of Cleveland is a good source of vitamin A. The child requires 5 to 10 drops each day.

The best natural sources of vitamin B are the whole grain cereals. Other sources are milk, some meats, vegetables and fruits. Recently vitamin B has received much attention. It is now added to practically every elimination diet. Young children tolerate White's Vitamin B complex very well. It is a liquid containing vitamin B, riboflavin, and other B complex factors. Usually 5 to 10 drops are given before each meal. White's Vitamin B complex concentrate tablets can also be obtained. Kapseal Combex of Parke, Davis and Company may be employed. The kapseals containing the vitamin B complex may be offered to older children.

The exclusion of citrus fruits and many vegetables cuts down tremendously the vitamin C content of the basic trial diet. However, this vitamin can easily be added to the diet by simply using cevitanic (ascorbic) acid tablets. The majority of the pharmaceutical organizations market a 25 mgm. tablet which is given two or three times a day in water.

Finally, we are concerned with vitamin D. It is found mainly in fish oils. Until fish is added to the diet, fish oils should not be used. Therefore, viosterol has commonly been employed as a substitute for cod liver or halibut liver oil. Some physicians have used crystalline vitamin D in propylene glycol. This preparation is called Drisdol and it is offered by the Winthrop Chemical Company. If there is definite evidence that no sensitivity to fish exists, then the Percomorphum oil (50 per cent) of Mead, Johnson and Co. or the White's Cod Liver Oil Concentrates can be administered in the regular standard doses.

The trial or elimination diet must be taken for at least ten days or even longer. If relief does not occur, another trial diet must be used. Not the slightest amount of any food not listed must be taken. To insure this, the parents must be fully acquainted with the diet. This cannot be stressed too much. Complete coöperation is absolutely necessary. Due to the small number of foods offered, it is essential for the child to eat large amounts of each food to insure a sufficient caloric intake. If the body weight decreases, the specified sugars, starches and oils must be increased.

With the relief of symptoms longer than former periods of freedom, foods are added one at a time about every three or four days. The first foods provided are the fruits and vegetables, leaving of course those giving positive skin reactions until the very last. If the child reveals any allergic manifestation after the ingestion of any one of the new foods, it should be eliminated at once.

The next foods added are the meats and cereals. The last foods to be furnished are the common allergens such as wheat, milk and egg. These should be added very slowly.

The following order may be used in returning the various foods to the child's diet.

Fruits—peaches, pears, bananas, apples, melons, berries and citrus fruits.

Vegetables—lettuce, squash, carrots, celery, potato, tomato, cabbage, cauliflower, peas and beans.

Meats—chicken (broilers or roosters), veal, beef, pork.

Fish—salmon, white fish and shell fish.

Cereals—barley, rice and oats.

Common allergens—wheat, milk and egg.

There are many chances for error in preparing the trial or elimination diets. Much has been written concerning the pitfalls in connection with these diets. Nevertheless, repetition at this time is still warranted since the various warnings cannot be emphasized too much. Always recognize the following suggestions as being very important.

1. Wheat elimination indicates the avoidance of commercial rye bread (made with wheat flour), pancake and cake flours, Pablum, grape nuts, Pep (cereal), canned corn (containing wheat flour), macaroni, spaghetti, noodles, crackers, sausages, gravies and any foods coming in contact with white sauces or gravies, many cooked salad dressings, malted milk, and Postum (made of wheat moistened with molasses).

2. Wheat substitutes are Ry-krisp, rye bread made with 100 per cent rye flour, muffins of rye, corn or oatmeal, pancackes using rice flour, cereals such as cream of rye, corn flakes, rice krispies, puffed rice, oatmeal, rice flour used to dredge meats, cornstarch, tapioca, or rice to thicken gravies, white sauce made with cornstarch, and cornstarch to thicken custards and vegetables.

3. Many parents do not wish to remove all milk products from the diet. This is, however, very essential in cases with marked milk sensitivity. Milk elimination requires the removal of milk products (cream, butter, cheese), bread, cakes, cookies, pastries, macaroni, some kinds of spaghetti, mashed potatoes, canned vegetables, soups, margarines (churned in milk), custards, puddings, ice cream, sherbets, candies, milk chocolate, malted milk and Ovaltine.

4. There are a few substitutes for milk. The less sensitive children may be able to tolerate unsweetened evaporated milk or the dry (powdered) milks. Goat milk is highly recommended by some physicians. Individuals very sensitive to the casein of milk cannot receive any form of milk. We have used in the infants and smaller children the soybean preparations. They are fairly good substitutes.

5. Butter is omitted when the child is very sensitive to milk. In its place salted Crisco, bacon or chicken fat, or salted yellow vaseline have been employed. The removal of butter lowers the vitamin A content of diet, and this vitamin must be returned to the diet in some other form.

6. Eggs and foods containing eggs are often not completely removed from a trial or elimination diet unless special precautions are taken. Omit from the diet breads, cake, cookies, brushed or glazed rolls and bread, macaroni, spaghetti, noodles (a few brands contain egg and therefore inspect labels), preserved meats, sausage, chicken (in the hen the unlaid egg may have broken), salad dressings, ice cream, sherbets, candies (especially the soft filled kinds), marshmallows, Rumfords and Calumet baking powder, Ovaltine, Cocomalt, soups and coffee cleared with egg.

7. There are fairly good substitutes for egg. Muffins can be made using Royal or K. C. baking powders which contain no egg, one teaspoonful of the baking powder being used for each egg in the recipe. Fruit pulp may also be added to the muffins. Cornstarch may be used in the preparation of cooked salad dressings and puddings, one tablespoonful of cornstarch taking the place of one egg. French dressing is substituted for mayonnaise. Gelatin takes the place of egg in ice cream.

8. Vegetables may occasionally lead to trouble in the basic elimination diet. Emphasis may be placed on the fact that tomatoes are included in sauces, catsup, dressings, flavorings, soups and meat sauces. Onion and garlic are in meat sauces, flavorings and soups. Celery salt is often used in cooking, in bouillon cubes, and in soft drinks.

9. Fruits may enter the trial diet without the patient's knowledge. Apple sensitive individuals must not use cider vinegar but instead white vinegar which is made from acetic acid. Jello contains pure fruit juice and therefore desserts should be made with gelatin and flavored only with the fruit permitted in the diet. Certain candies, cookies and cakes will contain fruits.

10. Children are often very sensitive to nuts which are found in cereal drinks, pastes, candies, flours, ice creams. Coconut is found in candies, cake pastries, in margarine and lard. Peanut oil is used to dilute olive oil.

11. Every effort is being made to prove that certain oils are not allergens. However, reports by careful observers continue to appear indicating that markedly sensitive individuals may react to an oil. Cottonseed sensitive children can be sensitive to poor grades of cottonseed oil which is used extensively in cooking and in manufactured substitutes for lard such as Crisco, Spry, Cottonlene, Snowdrift, Wesson oil, and Primrose oil. Olive oil is often adulterated with cottonseed oil. The oil is used in frostings, candies and cookies. It is also employed in nut pastes and in blanching nuts. Sardines, salmon, tunafish and sturgeon are often packed in cottonseed oil.

12. Finally, note must be made of the fact that the dishes and pans used for preparing the basic elimination diet should be washed very carefully. A small particle of the offending substance may cause a reaction. Restaurant food often contains slight amounts of forbidden foods, due at times to poorly cleansed cooking utensils or carelessness in cooking. Menus for patients eating in a restaurant must be very simple. The allergic child on a trial diet will do best when all of the meals are prepared and served in his own home with strict adherence to the orders of the family physician.

Human Serum and Specific Agents in the Treatment of the Acute Meningitides*

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It has been shown that the addition of fresh human serum to antimeningococcus serum increases the bactericidal power and opsonic activity of that antiserum. Bunim and Wies[1] reported a case of meningococcus meningitis in which fresh human serum had been used in combination with the regular antimeningococcus serum. The antiserum therapy was followed by a clinical improvement but the cultures from the spinal fluid did not become sterile. After 28 consecutive positive cultures, fresh normal human serum was administered intraspinally followed by additional antiserum, with immediate sterilization of the fluid. The authors came to the conclusion that when a case is resistant to an antiserum that agglutinates the recovered organism satisfactorily, the addition of fresh normal or convalescent human serum to the antiserum may be indicated. The exact proportions of the serum to the antiserum was not determined but it was suggested that 5 cc. of fresh human serum and 15 cc. of antimeningococcus serum is a satisfactory proportion. Fonde[2] reported two cases in which fresh human serum was used in combination with antiserum, with good results.

Buttle, Gray, and Stephenson[5] in 1936 showed in their series of experiments on mice that the administration of sulfanilamide by mouth or intramuscularly protects the animals against fatal doses of meningococci. This work was confirmed by Proom.[6] Branham and Rosenthal[7] went further and showed that the protective value of sulfanilamide on mice against meningococci is equal to that of serum but that the best results were obtained when both were used in combination because an apparent synergistic action seemed to exist.

Schwentker[8] in 1937 reported 52 cases of meningococcic infections treated exclusively with sulfanilamide with eight fatalities or a fatality rate of 15 per cent. Of 278 consecutive patients treated with antimeningococcus serum in the months immediately preceding the instigation of sulfanilamide therapy, the mortality rate was 30 per cent as compared with 15 per cent for the drug. The drug was administered both intraspinally and subcutaneously in a concentration of 0.8 per cent. To some patients it was given by mouth. Willien[9] treated five cases and one recurrence with oral sulfanilamide with no fatality. He concluded that the response to treatment was satisfactory even with oral therapy alone. Both the above workers showed that the spinal fluid became negative within 24 hours in the majority of instances. Recently Eldahl[10] treated 12 cases of meningococcic meningitis in children under 4 years of age with intrathecal and intramuscular injections of 0.8 per cent sulfanilamide solution with three fatalities (25 per cent), whereas formerly the mortality in this age group averaged 70 per cent. He concluded that "sulfanilamide treatment . . . has but little effect if the remedy is administered exclusively by mouth or intramuscularly. But if it is given intrathecally along with the other administrations, then the treatment is very valuable. This is probably because the elimination of the sulfanilamide through the meninges may be very slow and very slight when they are inflamed. It is not likely that intrathecal injections alone are sufficient, because the meningococci can be found outside the spinal canal, and on these the sulfanilamide when given by mouth or intramuscularly, can have considerable effect."

Allott[11] using Marshall's original method[12] determined the sulfanilamide content of the cerebrospinal fluid during treatment of 36 cases of meningococcus meningitis and found that in many cases the concentration takes several days to reach a maximum, the dosage being kept constant. He found considerable variation in the speed with which the effective level is reached and maintained on equivalent dosage. He surmised that this variation is due more to differences in the ratio of excretion rather than to a variation in meningeal permeability as the blood sulfanilamide level also showed similar variations.

The latest report is by Waghelstein[13] who reported 72 cases treated with sulfanilamide alone with a mortality of 15 per cent, 34 cases treated with sulfanilamide and serum with a mortality of 24 per cent, or a total of 105 cases treated with sulfanilamide either alone or in combination with serum with a mortality of 18 per cent. Of 368 cases treated with antiserum prior to sulfanilamide, the mortality averaged 27 per cent. The number of lumbar punctures performed was markedly reduced so at present the author performs only two taps. He found that complications due to sulfanilamide were mild and few and the number of recurrences were reduced. The complications due to meningococcic infections, however, were not reduced in occurrence. He also found that the spinal fluid cultures were more consistently sterile after 12 to 24 hours of treatment in those cases in which sulfanilamide was taken every four hours by mouth or by naso-gastric catheter rather than when given every 12 hours by hyperdermoclysis.

Marshall and his co-workers[14] showed that the sulfanilamide level in the spinal fluid is almost on the same level as that of the blood, showing that the drug readily passes through normal or pathologic meninges. The

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observations of Eldahl[10] and Allott[11] does not coincide with the results obtained with the drug by American workers. This may be due to the fact that technical difficulties were encountered by using Marshall's original method of sulfanilamide determination. In our experience Marshall's original method gave low sulfanilamide levels both in the blood and in the spinal fluid. By using Marshall and Litchfield's[14] modified method much better results were obtained, the sulfanilamide level being on an average 10 per cent lower, than that in the blood. The absorption was good whether the drug was administered orally, subcutaneously, or intramuscularly.

Our experience to date totals 13 cases treated with sulfanilamide alone and 7 cases treated with sulfanilamide in combination with massive doses of antitoxin intravenously. We have had no deaths in these 20 cases. We have found that intraspinal administration was not necessary. Waghelstein's[13] recommendation of administration by stomach tube has been found to be successful in infants, but in older children and adults due to the frequency of vomiting which accompanies the disease it has been found to be unsatisfactory. In the latter case, the drug was administered by hypodermoclysis in the form of 1 per cent solution in Hartman's solution every eight hours during the critical stage of the disease and in those patients who cannot tolerate the drug by mouth. In all other instances, the oral route of administration has been satisfactory. In adults we have given an initial dose of ½ grain per pound of body weight followed by a maintenance dose of ¾ grain per pound of body weight daily in divided doses. In infants and children, who generally tolerate the drug better, we have given an initial dose of 1 grain per pound of body weight followed by a maintenance dose of 1 grain per pound of body weight daily in divided doses.

Seven cases were treated with sulfanilamide in combination with massive doses of antitoxin intravenously—100,000 to 200,000 units. The results were more striking and immediate with prompt subsidence of toxic symptoms and fall of temperature with crisis. The remarkable rapidity in which the spinal fluid was sterilized was noted. In no instance was a positive culture obtained after 24 hours of sulfanilamide therapy. This cannot be said of either antiserum or antitoxin.

Waghelstein reported that complications associated with meningococcic infections occurred just as frequently as in cases in which antiserum was used. In 368 cases treated with antiserum, arthritis developed in 10, endophalmitis in 2, and deafness in 6. In 106 cases treated with sulfanilamide, arthritis developed in 5, endophalmitis in 1, and deafness in 5. This as well as our observations, indicates that sulfanilamide does not combat toxemia directly and that the attack must be on the organism. As Ferry has pointed out, the toxins give the characteristic symptoms of the disease as well as the permanent defects. It is reasonable to conclude, therefore, that the ideal therapy would be a combination of large doses of antitoxin intravenously to combat the toxemia together with continued administration of large doses of sulfanilamide orally or subcutaneously to destroy the organisms.

Outline of Treatment for Meningococcic Meningitis

1. Spinal puncture for diagnosis. Enough fluid is withdrawn for laboratory study. The fluid is analyzed for cell count and differential, organisms by smear and culture, protein, sugar, and Wassermann.

2. If the fluid is cloudy, sulfanilamide is administered immediately subcutaneously in the form of 1 per cent solution in normal saline or Hartman's solution in dosages previously suggested. The drug is then administered orally every four hours if tolerated by this route. If not, subcutaneous injections of the 1 per cent solution are given every eight hours. The dosage used has previously been mentioned.

3. Antimeningococcus antitoxin is given in massive doses intravenously as early as possible. In children 50,000 units are given and in adults 100,000 units. This may be repeated the next day if favorable response is not obtained in 24 hours. The serum is placed in 200 to 500 cc. of 10 per cent dextrose solution in normal saline together with ½ cc. of 1:1000 adrenalin solution and administered slowly at the rate of 30 to 60 drops per minute. Sensitivity of the patients to horse serum should be tested. The antitoxin is given after the causative organisms have been definitely identified. In allergic patients we do not recommend serum administration.

4. Spinal punctures are done only as indicated for drainage and to reduce intracranial pressure. Usually two or three taps are all that is necessary.

5. Since sulfanilamide therapy was started, cisterne drainage has not been found necessary.

6. The administration of general anesthesia for spinal punctures is conducive to bronchopneumonia which usually is fatal. The elimination of spinal taps to a minimum and elimination of intraspinal therapy is a great advantage.

7. Administration of parenteral fluids in comatose patients, and fluids and feedings by stomach tube in infants are highly desirable.

8. Special nursing care in turning the patients from side to side to prevent hypostatic pneumonia is emphasized. Restraints should be avoided if possible.

9. Morphine is avoided because of its respiratory depressing effect. Sedatives if given should be used to quiet the patient and not to the point of anesthesia.

10. Blood transfusions are indicated when the hemoglobin or white blood count is low.

Fever Therapy

Bennett, Person, and Simmons and Platou, MacElmeel, Stoesser and Cooke in 1936 showed for the first time experimentally as well as clinically that sustained artificial fever at 41.5 degrees C (106.8 F.) for eight hours destroys most strains of meningococci. Both groups of workers recommended hyperthermia in chronic or subacute cases that are resistant to serum therapy. They emphasize, however, that fever is contraindicated in the acute toxemic phase of the disease.

Streptococcus Meningitis

Prior to the advent of sulfanilamide, many therapeutic measures were exploited for a possible cure of streptococcus meningitis. Some of these were based on sound physiological principles. Successful results in 61 proved cases of this disease reported up to 1935 and tabulated by Gray[16] are attributed in some instances to one or another procedure. Repeated spinal drainage, surgical drainage (Dandy[17]), spinal-cisterne lavage with various solutions, intrathecal injections of antiseptics and sera, ethyl hydrocupreine hydrochloride (Kolmer[18]), intravenous injections of dyes, sera, and antiseptics, blood transfusions, etc., have all been tried with occasional recoveries. The multiplicity of methods employed, however, is perhaps an indication of the lack of specific effectiveness of any one or combination of procedures. The more critical authors agreed that early diagnosis, complete eradication of focal infections, and adequate drainage were most responsible in the success of any proposed treatment.

Since sulfanilamide was introduced in 1935[37] for the treatment of streptococcal infections, there have been innumerable reports of rapid recoveries. Neal[20] in a recent article reported that in hemolytic streptococcus meningitis using sulfanilamide in 27 cases, the mortality was reduced from over 95 per cent in previous years to approximately 20 per cent. Eley[21] stated that during the ten year period prior to the use of sulfanilamide at the Infants' and Children's hospitals of Boston 92 cases of hemolytic streptococcus meningitis were treated by the usual methods with only one recovery. Since the use of sulfanilamide, six cases were treated with six recoveries. Silverthorne and Brown[22] reported that from 1924 to 1936, 93 cases were treated at the Hospital for Sick Children in Toronto, Canada, with one recovery. During 1937, nine cases were treated with prontosil and sulfanilamide or both with continuous intravenous injections of glucose-saline, daily spinal punctures, and mastoidectomy when indicated, with five recoveries.

Smith and his co-workers[23] reported a recovery from an anerobic beta hemolytic streptococci, meningitis of otitic origin treated with prontosil and sulfanilamide. Schwentker et al[24] reported that whereas no recoveries occurred in 37 cases treated at the Johns Hopkins Hospital in the last 15 years, three recoveries out of four occurred since the use of sulfanilamide. Schwentker[25] later reported 19 recoveries in 23 cases. Applebaum[26] reported 26 cases of otitic or sinus origin with 21 recoveries, whereas for 28 years prior to 1936, 274 cases were treated with only 15 recoveries. Retan,[27] Martin and Ellenberg,[28] Litvak and Klughertz,[29] Weinberg and associates,[30] Vitenson and Konstam,[31] Woodman,[32] Godwin,[33] Lewy,[34] Anderson,[35] Smith and Coon,[36] Love,[37] Cline,[38] and others reported favorable results with recoveries using sulfanilamide or its derivatives. The lowering of the mortality from about 97 per cent to less than 20 per cent shows the effectiveness of sulfanilamide in the treatment of this highly fatal disease.

At the Minneapolis General Hospital from 1922 to 1938, we have had 137 cases of streptococcus meningitis with only two recoveries. These two were treated with repeated drainage, saline irrigations, scarlet fever antitoxin, mastoidectomy, and repeated transfusions. Other methods of therapy, such as Kolmer's intracarotid injections of optochin, sera, etc., were tried without success. Since 1937, we have treated eight cases of streptococcus meningitis with sulfanilamide with eight recoveries.

The outline of treatment followed is similar to that described for meningococcus meningitis, except that no sera are used. Spinal punctures were done only as indicated to decrease pressure and for drainage when the fluid was extremely cloudy. On an average, daily spinal punctures were done for four or five consecutive days. Early diagnosis, prompt and complete eradication of foci of infection, and early treatment are highly important to get the best results. Repeated observations at autopsies have revealed a hidden mastoid focus in patients with a previous history of otitis media but with no X-ray or clinical evidences of mastoiditis. Early treatment will prevent the formation of a localized meningitis. It has been our experience that sulfanilamide will not invade localized accumulations of pus, and therefore the drug will be ineffective when such a condition arises. Frequent transfusions have helped to improve the patients' general condition.

Pneumococcus Meningitis

The treatment of pneumococcus meningitis has always been unsatisfactory. With the discovery of sulfanilamide and experimental observations that the drug is effective against the pneumococci, tremendous impetus has been given to the treatment of this condition. Clinical observation, however, does not seem to indicate that this drug is as effective against the pneumococci as against the streptococci or the meningococci. Mortality reports prior to sulfanilamide have averaged 99 per cent, so that any form of therapy seems worthwhile.

Neal and Applebaum[39] reported 100 per cent fatality prior to 1936. Finland and his associates[40] reported 96 cases from 1926 to 1936 all of which died. Shaffer, Enders and Wilson[41] reported 74 cases from the Boston Children's Hospital with one recovery. Toone and Heggenbotham[42] reviewed 31 recovered cases and found that the treatment varied but most patients received some chemical or immunological agent. Optochin recommended by Kolmer was the drug most frequently used. Fifteen of 31 cases received homologous antipneumococcus serum intravenously, intraspinally, or by both routes. Daily lumbar drainage, cisterne drainge, gential violet, Pregl's solution, mercurochrome, autogenous vaccines, urotropin orally, etc., have all been tried both here and elsewhere with very little success.

Branham and Rosenthal[7] and Osgood[43] reported that in vitro experimentally sulfanilamide and serum are more effective against the pneumococci than either used alone. Since the use of sulfanilamide, there have been some reports of better results but these have not been as striking as with streptococcus or meningococcus meningitis. Applebaum[26] reported four cures and two possible cures

in 32 patients treated with the drug. Finland and his associates[40] from the Boston City Hospital reported six recoveries in ten cases using sulfanilamide in large doses in conjunction with specific complement and serum. Eley[21] treated six cases with the usual doses of sulfanilamide with no recoveries.

Robertson[44] and Ward and Enders[45] stated that for the phagocytosis and destruction of pneumococci, it is necessary to have specific antibody, an adequate number of leucocytes, and complement in the spinal fluid.

Since the best result to date is that reported by Finland et al, it may be worthwhile to dwell upon his conclusions and to review his outline of treatment. These authors found that sulfanilamide inhibits the growth of pneumococci, may clear bacteremias of low grade, reduce the number of pneumococci in the spinal fluid, and occasionally may cure a case but the spinal fluid culture remains positive for organisms for many days.

When used in conjunction with serum, however, it completely cures many severe pneumococcal meningeal infections. Moreover, they have found that with rare exceptions, complement cannot be demonstrated in the spinal fluid, when complement is injected it disappears rapidly, no antibodies can be demonstrated in the spinal fluid, antibodies contained in specific sera given intravenously does not invade the spinal fluid, bacteremia is frequently present or develops during the course of the disease, large amounts of specific antibody introduced into the spinal canal may be harmful by the effect of the precipitate formed from the interaction of serum and antibody, by the agglutination of pneumococci, and by the deterrent effect of both of these factors on the action of the leucocytes present in the spinal fluid. He has, therefore, recommended an outline of treatment.

Reports from the literature indicate that Type 1 is most frequent in primary infections and Type 2 in cases secondary to otitic or sinus origin. The most frequent types in our series have been Types 1, 2, 3, 4, 5, 6, 7, and 8.

At the Minneapolis General Hospital from 1922 to 1936, we have had 85 cases of pneumococcus meningitis treated by various methods with no recoveries. In 1937-1938, we have treated four cases with type specific serum intravenously together with the usual dose of sulfanilamide with no recoveries. In 1938, we have treated two cases with three times the recommended dosage of sulfanilamide with one recovery. The other case that died showed at autopsy that the meninges and the surface of the brain were free from pus except for a localized abscess in the frontal area of the brain, and an extensive bronchopneumonia. We are quite sure that this patient would have recovered had it not been for his pneumonia. In both of these cases the sulfanilamide content of the spinal fluid ranged consistently between 20 to 32 mg. per 100 cc. The case that died was Type 3, and the recovered case belonged to a higher type because no reaction occurred with homologous sera Types 1 to 24.

Eley[21] recently suggested that larger doses of sulfanilamide to produce a concentration of the drug in the spinal fluid of 25 to 35 mg. per cent may be more effective.

Early in 1938, the English drug house, May and Baker, announced that 2—(p-aminobenzenesulfonamide-pyridine) had been found to protect mice against invasion by pneumococci to a greater extent than sulfanilamide. This drug is marketed in Great Britain under the name M & B 693 or "Dagenan".[46] Using this drug, Reid and Dyke,[47] Robertson,[48] and Cunningham[49] reported recoveries from pneumococcus meningitis. Various English authors[50] have shown the superiority of sulfanilamide-pyridine in pneumococcic infections in man, thus confirming the claim of May and Baker. The exact mode of action of the drug against the pneumococcus is not known. Fleming[51] stated that the drug "does not in vitro prevent the capsulation of pneumococci. A more likely mode of action is simple inhibition of growth (and possibly of toxin formation), and while the organism's growth is stopped and its vitality lowered, some agent in the body damages the capsule or perhaps some autolytic process occurs." Experiences with this drug in our hospital seem to indicate that it is most effective against the lower types of pneumococci, particularly Types 1 and 3 which are the most common causative agents for pneumococcus meningitis. Sulfanilamide-pyridine has not been used long enough to warrant any conclusions being drawn, but it offers a hopeful outlook for this highly fatal disease.

Outline of Treatment for Pneumococcus Meningitis

1. Complete drainage of spinal fluid and use for culture and type identification.
2. Large doses of sulfapyridine.
3. Give homologous type specific horse or rabbit serum intravenously.
4. One to two hours after serum has been administered, 15 cc. of the patient's venous blood are withdrawn and the serum separated. Another lumbar puncture is done and this fresh serum is given intraspinally.
5. In infants and small children or where frequent venepunctures are not desirable, fresh human serum obtained from any suitable donor is collected and used together with 0.5 to 1 cc. of type specific serum for intraspinal injections. Thereafter, lumbar punctures are done three or four times daily or as indicated.
6. Fresh human serum and specific serum administration intraspinally may be repeated several times depending on the findings in the spinal fluid.
7. Frequent transfusions of blood.
8. Eradication of foci of infection.

Influenzal Meningitis

Incidence

Influenzal meningitis is essentially a disease of infancy and early childhood. Taking all ages into consideration, Neal[52] ranks it fourth among the purulent meningitis. However, among 184 children under 2 years of age admitted to the Children's Hospital of Boston with purulent meningitis from 1926 to 1931, Ward and Fothergill[54] reported that it ranked second only to

meningococcic meningitis in incidence. Neal in her series reported 84 per cent were under 5 years of age. Fothergill and Wright[54] found that 80 per cent were between the ages of 2 months to 2 years, and that there were no cases in infants below 2 months. This they attributed to a passive immunity derived from the mother. In our hospital, influenzal meningitis has been very rare. This may be due to difficulty in identifying the organisms due to marked pleomorphism and also the fact that the bacillus of influenza does not grow well on ordinary peptone media.

Prognosis and Mortality

Mortality has varied from 98 to 100 per cent. Prognosis is always poor whether specific serum is used or not. Recovery is more frequent in children over 2 years of age. Huntington and Wilkes-Weiss[62] treated 39 cases without serum with two recoveries. They collected 500 cases from the literature and of 373 infants under 2 years, there were nine recoveries (97.6 per cent fatality) while 26 of 127 children over 2 years of age recovered (79.5 per cent fatality). Neal in 111 cases gave a fatality rate of 96.4 per cent. Rivers in 220 cases reported a fatality of 92 per cent. Bloom[55] in 1931 collected 302 cases with 92 per cent mortality.

Treatment

Wollstein[56] first developed serum in experimental work protecting monkeys with such serum. Ward and Wright,[57] and Ward and Fothergill[53] reported that complement was lacking in the spinal fluid of influenzal meningitis patients and recommended the addition of normal serum to anti-influenzal serum before injection. Pittman[58] in 1933 developed type specific antiserum and used it in 18 cases with one recovery. Ward and Fothergill stated that too much antiserum for the concentration of complement present nullified effective bacteriocidal action. They treated five patients with specific antiserum and complement. All died but they noted that the cerebrospinal fluid was sterilized for varying periods of time up to 14 days. Autopsy showed that the cause of death was localized abscesses shut off from the general subarachnoid space and so protected from the action of the complement and specific antiserum.

Fothergill[63] in 1937 reported 201 cases treated with antiserum and complement with 31 recoveries or a fatality of 84.6 per cent. He believes that the organisms enter the body via the respiratory tract, then invade the blood stream, and finally localize in the meninges. He has outlined the following method of treatment:

1. Specific serum is given intravenously once daily for two days, 30 cc. for infants and 30 to 50 cc. for older children. This is done to overcome bacteremia.
2. Mixture of antiserum and complement (fresh human serum) is given intrathecally twice daily for as long as indicated. The proportions recommended were 15 cc. of antiserum and 8 cc. of complement.
3. The spinal fluid is completely drained.
4. Since many patients receiving this treatment show evidences of temporary improvement followed by rapid fatal relapse, treatment should be continued longer than one imagines would be necessary.
5. Since in cases that died following a relapse, the cause of death was due to localized abscesses, early treatment aimed toward prevention of the formation of these abscesses seems important.

Eley[21] reported in 1938 that at the Infants' and Children's Hospitals of Boston, 96 cases of influenzal meningitis were treated with specific serum with six recoveries. Six cases were treated with specific serum combined with sulfanilamide with no recoveries. One case was treated with sulfanilamide in amounts sufficient for a concentration in the spinal fluid of 25 mg. per cent with recovery. He, therefore, suggested that a higher dosage may bring better results.

At the Minneapolis General Hospital from 1922 to 1938, we have had 17 cases of proven influenzal meningitis treated by various methods with no recoveries. From a review of the literature, it is reasonable to expect the best results would be obtained by a combination of specific antiserum together with large doses of sulfanilamide.

Staphylococcic Meningitis

Occasional recoveries from staphylococcus meningitis have been reported, but the mortality from this disease has been practically 100 per cent. Since most of our cases have developed in the course of a generalized septicemia, we have had no recoveries in 15 cases treated from 1922 to 1938. Repeated blood transfusion, vaccines, sera, antiseptics, chemicals, etc., have all been tried with futile results. Fenton and Hodgkiss,[59] Maxwell,[60] and O'Brien and McCarthy[61] recently reported recoveries from staphylococcus septicemia following the use of sulfapyridine.

Summary and Conclusions

1. An analysis of the cases and treatment of meningococcic, streptococcic, pneumococcic, staphylococcic, and influenzal meningitis at the Minneapolis General Hospital during the period 1922 to 1938 are given.

2. Meningococcic, streptococcic, and pneumococcic meningitis were encountered most commonly in the order given, while influenzal meningitis has been infrequently diagnosed, probably because of the difficulty in isolating and identifying the Pfeiffer Bacillus.

3. Approximately 50 per cent of cases of secondary meningitis were of otitic origin.

4. All forms of meningitis are more common in the male.

5. The case fatality rate from meningococcus meningitis in Minnesota has ranged from 40 to 45 per cent.

6. The use of meningococcus antitoxin did not cause a lowering of the fatality rate as compared to antiserum.

7. Sulfanilamide used alone in 13 cases of meningococcus meningitis has been highly successful with no fatalities. The rapidity in which the spinal fluid was sterilized has been noted. In no instance were organisms

recovered on cultures after 24 hours of treatment with the drug.

8. Sulfanilamide does not combat toxemia. Once the exotoxin unites with tissue, drugs or sera will probably not neutralize it. This is evidenced by the fact that although the mortality has been lowered by the use of the drug, the incidence of complications and sequelae has not been affected.

9. Experimental and clinical evidence suggests that sulfanilamide acts synergistically with specific serum. In seven cases of meningococcus meningitis receiving the combined therapy of sulfanilamide and antitoxin, toxemia rapidly subsided and spinal fluid cultures became sterile within 24 hours. It seems, therefore, that the ideal therapy would be early administration of massive doses of antitoxin intravenously combined with continued large doses of sulfanilamide.

10. *Since the use of sulfanilamide, spinal punctures* for meningococcus meningitis have been reduced to two or three, and cisterne puncture has not been necessary.

11. Narcotics should be avoided in all forms of meningitis because of the respiratory depressive effect.

12. Blood transfusion is a valuable adjunct in the therapy of meningitis.

13. From 1922 to 1937, 137 cases of streptococcus meningitis have been treated by various methods with only two recoveries, a fatality of 98.5 per cent. With sulfanilamide, we have had eight recoveries in eight cases.

14. During the same interval, 85 cases of pneumococcus meningitis were treated with 100 per cent mortality. Since 1938, four cases were treated with type specific sera intravenously plus sulfanilamide in the usual dosage with no recoveries. Two cases were treated with massive doses sufficient to raise the spinal fluid sulfanilamide level to 25-35 mg. per cent, with one recovery.

15. Sulfanilamide is not effective in localized accumulations of pus. Therefore, early and complete eradication of foci in secondary meningitis is important.

16. Intravenous or intrathecal administration of type specific sera in pneumococcus meningitis has not been effective. Lack of complement and antibody in the spinal fluid has been demonstrated. Therefore, the addition of these substances into the spinal fluid as recommended by Finland and associates may be a valuable procedure.

17. Sulfapyridine has been responsible for a few cures in pneumococcic meningitis.

18. Seventeen cases of influenzal meningitis have been treated by various methods with no recoveries. Usual doses of sulfanilamide have not been effective. Eley's recommendation of massive doses of sulfanilamide to raise the spinal fluid concentration to 25 mg. per cent of the drug is worthy of consideration.

19. The treatment of staphylococcus meningitis has not been satisfactory. Recent reports in the English literature seem to indicate that sulfanilamide-pyridine may be effective in the treatment of staphylococcus septicemia and meningitis.

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MATERNAL CARE

It has been estimated that from one-half to two-thirds of the maternal deaths which occur each year in this country are preventable. This conclusion has been reached after careful study of records of many thousands of maternal deaths. As a result of these studies, most state medical societies have formed committees to study the maternal care problems within their own state. This plan is an important factor in the reduction of our maternal mortality rate. Dr. Moore has presented maternal mortality figures for North Dakota in this issue. The Maternal and Child Welfare Committee of the North Dakota State Medical Association, and Dr. Moore, as its Chairman, is to be congratulated on the fine results obtained in North Dakota. Their low maternal mortality rate for 1938 is a goal which could be set by all states. In comparable studies it is believed that many neonatal deaths are unnecessary. If we are to lower our maternal and infant mortality to an irreducible minimum, we must give our mothers and babies better care. This can be accomplished by a three-way educational program. The public must be made aware of the importance of early and continuous maternal care. Local communities must work out a plan to furnish satisfactory care to the needy. The medical and nursing professions must assume responsibility for the development of such an educational plan. They must also see that facilities are available so that each patient may have adequate care during her pregnancy, labor and puerperium.

F. L. M.

WE LOOK AHEAD

Stirred finally from smug complacency, the medical profession of the United States has taken on new life. Whether we give credit to the politician of the Hoover regime or the New Deal, the Parent-Teachers' Association or the American Legion, the subdivision of the American Medical Association into specialties, public health departments or the social welfare groups, or all together opening new vistas, we must admit that our profession is finally again on the march in its attempt

to produce modern medicine—proved medicine—for all classes and conditions of people. Medical care is either a luxury or a necessity. It must either be allowed to drift along as some individual physician might want, or it must be kept up to date by all those practicing the profession. Feeling that medicine is a necessity and that there is a distinct need to provide the best for all, the present administration in Washington has put on a concerted drive through the Children's Bureau and the Public Health Department to encourage medical men through funds and suggested programs to do for their various localities what may be necessary in order to provide the best available care, particularly to mothers and children.

The very first of the practicing profession in North Dakota to see just what this awakening would mean to the profession and public alike was Doctor John Moore of Grand Forks. Four years ago he organized the obstetrical and gynecological men of the state and started a state-wide program of instruction by local qualified obstetrical men. Outside men of renown in this work were brought in and traveled the state. The profession was slow to grasp the idea. The state medical association, however, soon realized the importance of the program and appointed a Committee of Maternal and Child Health with Doctor Moore as chairman.

Eager to be leading and not following, Doctor Moore conceived the idea over a year ago of how to put on a drive to lower infant mortality in North Dakota. At the meeting of the Committee last fall in Grand Forks, he unfolded his plan. Doctor Maysil Williams, State Health Officer and Secretary of the Committee, readily agreed to assist in financing the plan through the government fund allotted to her department for this type of work. She also agreed to aid in organizing the meetings through her publicity department and state-wide nursing service. Let me acknowledge here that I am confident that such success as the program may have had should be credited to the North Dakota State Health Department for the thorough coöperation.

Prematures account for over 33 per cent of the infant deaths in North Dakota. Nation-wide statistics as compiled in Washington show 42 per cent of infant deaths accounted for by prematures. We realize that the infant mortality rate has been steadily improving nationally and in North Dakota according to figures compiled since 1914. The premature rate, however, has remained stationary. Every physician and nurse has always felt a definite hopelessness in caring for the premature. These facts make one realize the importance of tackling the premature mortality rate first. Survival was always very definitely dependent upon the constitution provided the newborn by the parent, and technique was hit or miss. This feeling existed even among pediatricians though each had a fondness for his own certain technique.

Last summer Doctor Moore had occasion to remain in Minneapolis several weeks, and while there, he became interested in Doctor Stoesser's work on prematures at Minneapolis General Hospital. In 1930 Doctor Stoesser took over the care of the prematures in that hospital. Statistics showed 60 per cent mortality. In 1931, 65 per cent of the prematures died. From then on a definite decrease was shown in the mortality rate each year until in 1938 it was down to 17 per cent. Doctor Stoesser's figures, his improvements and combinations in care, his writings have brought due recognition and his technique will now be quoted in the Government Infant Care Manual as the accepted one. His enthusiasm and ready coöperation made the task of arranging the work for presentation comparatively simple for us. He provided the slides to use in the lantern during the lecture and provided the routine. This fall he will follow up personally in a trip over the state as visiting pediatrician for the postgraduate courses.

Through W.P.A. and the Carpenter Department, the University of North Dakota built "low cost incubators" with temperature and humidity control. These are available to any medical unit for $53.00. The open market cost for the same incubator is $170.00. So far, thirty such incubators have been distributed throughout the state, and the physicians using them have already been convinced of their value for full term as well as premature care.

In order to bring this Stoesser routine on premature care to the doctors and nurses of the state, seventeen towns scattered over the entire state were visited. Afternoon lectures were given to the nurses and evenings were spent going over the outlines with the physicians. The usual attendance of nurses was about thirty. The largest meeting was in Minot where there were 135 nurses present. The usual attendance of physicians was fourteen. The largest attendance was 53 at Bismarck and the lowest 7 at Fargo.

We, the members of the Committee on Maternal and Child Welfare, are confident all will coöperate more in planning new features to be brought to us in our own localities—as "we look ahead."

R. E. P.

MINNESOTA MEDICAL SCHOOL CELEBRATES GOLDEN ANNIVERSARY

This year marks the completion of the first half century of medical education by the State University in Minnesota. A program celebrating this event will be held on the University campus on October 12, 13 and 14, the details of which are published under "Future Meetings."* A half century ago, the charters and properties of private medical schools in Minneapolis and St. Paul were formally turned over to the Board of Regents of the University of Minnesota, who thereupon assumed responsibility for the provision of adequate medical teaching for the State.

That obligation has been viewed seriously, and in the years that have intervened a scientific institution has been built, of which the early founders might well be proud. The ideals of those pioneers have been given expression in an enterprise which stands as one of the best of its kind in the world, whose success represents the most complete vindication of the wisdom of the leaders in Northwest medicine of that earlier day in placing upon the community at large the burden and

the privilege of supporting and determining the course of professional medical education.

Medical education is peculiarly a coöperative enterprise between persons devoting their whole time and energies to it, and those professional men and women who give generous portions of their service to it while carrying on the work of the profession in the community. The University of Minnesota Medical School would not be the type of institution it is today without the loyal and energetic support it has had from the medical profession of the community. Medicine is the application of science to an art, and the physicians who are practicing that art in the community are indispensable to the teaching of new generations of physicians.

But the relationship is reciprocal. The physicians of the State gain immeasurably by the presence of a nucleus of enthusiastic but critical teachers and investigators whose influence touches in numerous intangible but none the less real ways upon medical practice, raising its tone and keeping the profession as a whole alert. A State University is a service institution. It is established and supported to supply the needs of the State in providing higher education and its adjuncts. It is an institution for the dissemination, preservation and furtherance of knowledge. All of its activities are, and must be, aimed at those fundamental ends.

The medical profession of the State of Minnesota has much to gain by promoting those fundamental aims of the University Medical School. They are purposes which serve the needs not only of the State as a whole, but particularly of the profession, because centers of research are the great flowing springs from which progress emanates. In no other activity is it as true as in medicine that to stand still is to move backward, because the forward stream of general progress does not cease. One can never find a mooring to stay at rest in medicine and remain in the first rank. A great University center of research is indispensable to the welfare of the Minnesota medical profession. In the future as in the past we must maintain the public appreciation of the importance of such work in order to safeguard the support on which it depends. The first fifty years are past, the future is ahead. Our predecessors have made the Medical School of this State what it is today. It is our job, not to rest on our oars and their laurels, but to continue to push forward, only so can we maintain the tradition of the past and keep the profession of medicine in Minnesota and the Northwest in the front rank.

INITIALED MEDICAL TERMS CONFUSE

There is need of another dictionary—one that will contain, in alphabetical order, all initialed abbreviations of these modern times. Physicians have been accustomed to some such short cuts in their nomenclature; but when those who held commissions in the M. R. C. of the regular army prior to the World War were required to take the correspondence course to fit them for active service, they were astounded at the numerous instances of abbreviation in military parlance. Actual war operations increased the usage tremendously, and in later years political organizations have availed themselves of this expediency to a great extent.

In visiting a highly organized clinic, it is interesting to observe how time is saved in various places by the same procedure. In the X-ray department, numbered booths line the corridor and attendants conduct patients to and from tables, while technicians carry out the snappy orders of the case assigning nurse. "Shoot a G. B. in six," is certainly not wasting the King's English. The operator quickly enters the little enclosure and says, "Take a deep breath, hold it," and turns on the juice. Again you hear his monotonous command, "Once more, take a deep breath, hold it." Then he emerges to do an A. P. or attend to some other alphabetical problem in another cubicle. Visiting physicians must be on their toes too to comprehend the latest time-saving initials recorded by the new set of hospital interns each year.

Sooner or later, we shall require a board to pass upon the orthodoxy of these appendectomized words. Some of them are of Latin origin and long usage, as the O.D. and O.S. of the oculist, the t.i.d., a.c., and p.r.n. of the prescription writer, and the letters indicating the various intrauterine positions recorded by the obstetrician; but since the War, in particular, there have been many injections from English phrases. Some of these are doubtlessly good, as in the case of E.K.G. and B.M.R.; but when one runs across such an expression as G.P.R. for the first time, the meaning is not clearly conveyed. We cannot afford to sacrifice clarity for brevity, and so we say, physicians need an I.M.L. Lexicographers, please take notice.

A. E. H.

Book Reviews

Varicose Veins, by Alton Ochsner, M.D., William Henderson professor of surgery and director of the department of surgery, School of Medicine, Tulane University of Louisiana, and Howard Mahorner, M.D., assistant professor of surgery, Tulane University; 147 pages, 50 text illustrations, 2 color plates; St. Louis: C. V. Mosby Co. Price, $3.00.

A 3% incidence of varicose veins in a large group of patients warrants an understanding of the clinical manifestations and the treatment of this condition. Prior to the last two decades the treatment of varicosities has been unsatisfactory because the therapy consisted principally of operative measures which were attended by a high morbidity and a high mortality. With the improvements in injection treatment of varicose veins in the previous decade, the immediate satisfactory results seemed to indicate that the ultimate in therapy had been attained. Subsequently, however, disappointing results in the form of recurrences were observed. This necessitated further efforts to improve the treatment. Detailed investigations on patients with varicose veins have demonstrated that the disturbed physiology in these patients varies considerably. A more complete understanding of the disordered function which can be determined more accurately by the use of appropriate diagnostic tests permits the formulation of a rational therapy. In this presentation an attempt is made to evaluate the clinical studies and methods of treatment and to present briefly the most modern therapy.

The 1938 Year Book of General Therapeutics, edited by BERNARD FANTUS, M.S., M.D., professor of therapeutics, University of Illinois College of Medicine; member, Committee on Revision of the U. S. Pharmacopeia and of the National Formulary Revision Committee; director of therapeutics, Cook County Hospital; and AARON L. GOLDBERG, M.D., assistant in medical dispensary, University of Illinois; Chicago: Year Book Publishers, Inc.

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Dr. BERNARD FANTUS has retained the editorship of the *Year Book of General Therapeutics* for twenty-one years, and the 1938 Year Book is the largest that he has published. Approximately two thousand medical articles are studied from the year's clinical literature. Material was selected according to two criteria: "Is it new?" and "Is it sound?—has it been proved clinically—is it ready for application in the average condition of progressive practice?"

A total of 474 articles is abstracted in this volume, making this book a progressive—yet conservative, up-to-date treatise in general therapeutics. Especially have been stressed those newer findings in regard to sulfanilamide, the vitamins, the endocrines, the newer forms of insulin, anesthetic drugs, refinement in transfusion—technics, methods and indications for injection therapy, and prescription writing. As the *Lancet* (London) said, "Guides are almost indispensable in the maze of medical literature; the Year Books are competent ones."

Gonorrhea in the Male and Female, by P. S. PELOUZE, M.D.; 471 pages plus index; 3rd edition; Philadelphia: W. B. Saunders Company: 1939.

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This third edition is the last word in gonorrhea. It surpasses by far the author's previous works. Every chapter teems with the practical and philosophical approaches with which patients suffering from this disease must be dealt. It is worthy of a place in every physician's and nurse's library, and may be called the most worthwhile book of the decade on gonorrhea.

Poisonous Plants of the United States, by WALTER CONRAD MUENSCHER, professor of botany, New York State College of Agriculture; 239 pages, bibliography 11 pages plus index; New York: The Macmillan Company: 1939. Price, $3.50.

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A brief compilation of the poisonous plants and their classification is presented in this volume. About 400 species of poisonous plants, representatives of 68 families, are discussed. There are 75 drawings which simplify the identification of the various plants. A very practical compend for physicians, botanists and people in animal husbandry.

Gross Anatomy, by A. BRAZIER HOWELL, associate professor of anatomy, Johns Hopkins University School of Medicine; 379 pages plus index; New York: Century Co., Inc.: 1939.

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This is a very practical textbook systematizing the macroscopic structures of the human body. Microscopic as well as minute insignificant details are omitted, thereby eliminating the confusion which confronts students in their first year of anatomy and avoiding the use of the laboratory manual as a text. There are 56 diagrams illustrating the most confusing structures. This is a very concise, practical reference for all students and any physician's library.

The 1938 Year Book of Dermatology and Syphilology, by FRED WISE, M.D., and MARION SULZBERGER, M.D.; 692 pages plus index; Chicago: The Year Book Publishers, Inc.,: 1939. Price, $3.00.

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The authors have very concisely summarized the newest trends in the dermatologic literature. Therapy of common skin diseases, syphilis and allergic skin disease is all simplified. One needs only to read this year book to keep up with the dermatologic trend of the entire world. It is a very valuable book for dermatologists as well as all physicians who have occasion to deal with the problems of skin diseases.

The Pneumonias, by HOBART A. REIMANN, M.D., professor of medicine, Jefferson Medical College, Philadelphia, formerly professor of medicine, University of Minnesota, formerly associate professor of medicine, Peking Union Medical College, Peking, China; with foreword by RUFUS COLE; Philadelphia & London: W. B. Saunders Company: 1938.

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Dr. REIMANN's volume, *The Pneumonias,* is a book which is intended for the general practitioner and the student of medicine. It is primarily designed to emphasize modern methods of classification, diagnosis, prevention and treatment of acute pulmonary infections. The more recent advances in the knowledge of pneumonias has replaced the older methods of classification and nomenclature of this disease. The topics of etiology, epidemiology, pathogenesis and roentgenographic examinations have been emphasized at the expense of physical signs and gross pathology. The academic aspects of pneumonia have been stressed, since all of the recent advances in knowledge of this disease are based on them.

This volume truly answers the objectives for which it was prepared, namely its use by the general practitioner and the student of medicine.

Standard Bodyparts Adjustment Guide; 170 pp. loose-leaf with bibliography and self-pronouncing glossary; Chicago: Insurance Statistical Service of North America: 1939; $8.00 including 10 years' revision service.

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The nature and background of industrial injuries or occupational diseases is usually a terra incognita to most laymen, claim adjusters, lawyers and insurance officials who are called upon to settle monetary considerations arising out of traumatic injuries and other conditions covered by insurance. This well illustrated volume, though originally intended for insurance men, should nevertheless be of interest to physicians and surgeons who have only occasional contact with compensable and insurable cases. It will be of especial value to those who are called upon to give expert testimony in such cases.

The features of this compilation are the following: a composite coast-to-coast average of medical fees for every type of service; a description of miscellaneous traumatic and bone injuries and their resultant disability periods; a persuasive percentage method for evaluating loss-of-use conditions; a comprehensive digest of regulations evolved under compensation statutes; a concise analysis of occupational disease signs, symptoms and environments; a readable text of 170 pages keyed to a self-pronouncing glossary; and a realistic reproduction of the incomparable Froshe Anatomical Charts, keyed to Latin and English definitions.

The Heart in Pregnancy, by JULIUS JENSEN, Ph.D., M.R.C.S., L.R.C.P.; first edition, 342 pages; St. Louis: C. W. Mosby Co.

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The author has added a useful and sane work to the scattered literature on this subject. He has painstakingly assembled and analyzed the historical as well as the present world literature and has added his own extensive observations. He has emphasized the necessity of considering the functional capacity of the heart as well as the anatomic lesion, in accordance with modern cardiology. The normal physiological changes of the heart and circulation in pregnancy are well explained. The difficulty of establishing definite indications for the termination of pregnancy in the presence of heart disease is brought out, and the treatment for various conditions given. The book should be extremely valuable to anyone doing cardiology, internal medicine, or obstetrics. A voluminous bibliography is appended to the end of the text.

The Vaginal Diaphragm, Its Fitting and Use in Contraceptive Technique, by LE MON CLARK, M.S., M.D.; 107 pages; St. Louis: C. V. Mosby & Company: 1939.

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This monograph is a practical and complete study of this method of contraception. The author answers all of the physicians' questions pertaining to this technique. Valuable information as to imparting instructions to patients is given.

Future Meetings

FIFTIETH ANNIVERSARY OF THE MEDICAL SCHOOL OF THE UNIVERSITY OF MINNESOTA

October 12, 13, 14, 1939

Theme: *Some Trends in Medical Progress with Particular Reference to Chemistry in Medicine.*

Anniversary Celebration

Half a century ago three private medical schools in Minneapolis and St. Paul turned over their charters and their properties to the Regents of the University of Minnesota. This occurred not by mere chance, but because of the untiring and statesmanlike efforts of a group of physicians, headed by Dr. Perry H. Millard, who envisioned for the State of Minnesota a single, strong, progressive Medical School as part of the State University.

The development of this school over its first half century—less than the life span of a single individual—has far exceeded the hopes and expectations of its founders. To take stock of progress to date, to pay tribute to the founders of the School and the builders of its name and to cast glances toward the future the special program herein described has been arranged.

The scientific sessions have been planned primarily for alumni, students, faculty, and other physicians, and scientists in related fields. To the University Convocation on Thursday morning and the General Session in Northrop Auditorium on Thursday evening the general public is especially invited; but all who are interested are cordially welcome to attend any of the sessions.

Schedule of Events

Monday to Wednesday, October 9, 10, 11—Medical Clinics arranged by Division of Postgraduate Medical Education.

Thursday, Friday, October 12, 13—Special Anniversary Program.

Saturday Morning, October 14—Aniversary Clinics.

Saturday Afternoon, 2:00 O'Clock—Football game, Purdue University vs. University of Minnesota, Memorial Stadium.

PROGRAM

for the Commemoration of the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota

Thursday, October 12, 1939

Morning Session, 9:00 O'Clock
Auditorium of Music Building

"The Colloid Chemistry of Membranes in Living Organisms"—Herbert M. Freundlich, distinguished service professor, University of Minnesota.

"The Performance of Osmotic Work in Living Systems"—Maurice B. Visscher, professor of physiology, University of Minesota.

"Some Reactions by Which Solutes May Be Differentially Concentrated by the Kidney"—John P. Peters, professor of medicine, Yale University.

"Medical Education, Research, and the Public Health"—Thomas Parran, Jr., surgeon-general, United States Public Health Service (University Convocation Address, 11:30 a. m., Northrop Auditorium).

Luncheon Round-Table Discussions, 12:30 O'Clock
Minnesota Union

"The Clinical Significance of Water and Electrolyte Balances."

"Blood Regeneration in the Anemias."

"Clinical Problems of Thrombosis."

"Current Trends in Public Health."

Afternoon Session, 2:30 O'Clock
Northrop Auditorium

"Organic Chemistry in the Pursuit of Vitamin Research"—Lee I. Smith, professor of organic chemistry, University of Minnesota.

"Investigations in Metabolism of the Fatty Acids"—George O. Burr, professor of physiological chemistry and botany, University of Minnesota.

"Production, Utilization and Significance of Blood Proteins" (annual lecture of the Minnesota Pathological Society)—George H. Whipple, professor of pathology and dean of the medical school, University of Rochester.

"Investigations in the Problem of Thrombosis"—Charles H. Best, professor of physiology, University of Toronto.

Evening Session, 8:00 O'Clock
Northrop Auditorium

"Medicine and the Commonwealth"—The Honorable Harold E. Stassen, Governor of the State of Minnesota.

"The Place of Medicine in a University"—Guy Stanton Ford, president, University of Minnesota.

"The Role of the Fundamental Sciences in Medical Progress" (the first Elias Potter Lyon lecture)—Anton J. Carlson, distinguished service professor of physiology, University of Chicago.

Friday, October 13, 1939

Morning Session, 9:00 O'Clock
Northrop Auditorium

"Recent Chemical Trends in the Study of Immunity"—Michael Heidelberger, professor of biochemistry, Columbia University.

"The Biology of Animal Virus Diseases"—Robert G. Green, professor of bacteriology, University of Minnesota.

"Observations upon the Mode of Action of Sulfanilamide and Its Derivatives"—Perrin H. Long, associate professor of medicine, Johns Hopkins University.

"Chemistry in Urinary Antisepsis"—Henry F. Helmholz, professor of pediatrics, The Mayo Foundation, University of Minnesota.

Luncheon Round-Table Discussions, 12:00 O'Clock
Minnesota Union

"Chemotherapy".

"Clinical Aspects of the Vegetative Nervous System."

"Clinical Physiology of the Gastro-Intestinal Tract."
"Neurophysiology".
"Mechanism and Manifestations of the Immune Response."

Chairman—A. T. Henrici, professor of bacteriology, etc.

Leader of Discussion: M. Heidelberger, professor of biochemistry, Columbia University.

Afternoon Session, 2:00 O'Clock
Auditorium of Music Building

"The Chemical Approach to the Problem of Convulsive Mechanisms"—Irvine McQuarrie, professor of pediatrics, University of Minnesota.

"Methods of Analysis of Nervous Action"—Herbert S. Gasser, director, Rockefeller Institute for Medical Research.

"The Nervous System in the Regulation of Visceral Processes"—Detlev W. Bronk, professor and director, Institute of Neurology, University of Pennsylvania.

"The Argument for Chemical Mediation of Nerve Impulses" (the annual Alpha Omega Alpha lecture)—Walter B. Cannon, professor of physiology, Harvard University.

Evening Session, 6:30 O'Clock
Ballroom, Minnesota Union

"The Medical School of the University of Minnesota in Retrospect and Prospect"—Harold S. Diehl, dean of the medical sciences, University of Minnesota.

"The Medical School from the Point of View of the Alumni" (the Herman M. Johnson lecture of the Minnesota State Medical Association)—Olaf J. Hagen, Class of 1906, Moorhead, Minnesota.

"Graduate Medical Education"—Donald C. Balfour, director, The Mayo Foundation, University of Minnesota.

Presentation of Distinguished Service Award of Minnesota State Medical Association Posthumously to Dr. William J. Mayo, Dr. Charles H. Mayo, and Dr. Herman M. Johnson—Dr. George Earl, president of the Minnesota State Medical Association.

"Progress in Medical Education on the American Scene"—Richard E. Scammon, distinguished service professor, University of Minnesota.

Saturday, October 14, 1939

Morning Session, 9:00 O'Clock
Amphitheater, University Hospital

Anniversary Clinics

"The Surgical Consideration of Essential Hypertension"—Alfred W. Adson, professor of neurosurgery, The Mayo Foundation, University of Minnesota.

"A Physiological and Surgical Critique of the Surgeon's Role in the Management of Peptic Ulcer"—Owen H. Wangensteen, professor of surgery, University of Minnesota.

"Certain Physiologic Concepts Important in the Practice of Cardiology"—Arlie R. Barnes, professor of medicine, The Mayo Foundation, University of Minnesota.

"Some Disturbances of the Vascular System in Pregnancy"—John L. McKelvey, professor of obstetrics and gynecology, University of Minnesota.

"Sprue and Related Diseases Affecting Intestinal Absorption"—Albert M. Snell, associate professor of medicine, The Mayo Foundation, University of Minnesota.

"Jaundice Due to Cancer"—Cecil J. Watson, associate professor of medicine, University of Minnesota.

There will be a luncheon meeting of the Minnesota Medical Alumni Association, University Hospital Dining Room, 12:30 P. M.

In connection with the Fiftieth Anniversary Celebration of the Medical School of the University of Minnesota, the Committee in charge wishes to extend a special invitation to Alumni and others to bring their wives or other relatives or friends to the Banquet on Friday evening at 6:30 P. M. in the Ballroom of the Minnesota Union. Formal or informal dress is optional.

NORTH DAKOTA SOCIETY OF OBSTETRICS AND GYNECOLOGY

The semi-annual meeting of the North Dakota Society of Obstetrics and Gynecology will be held at the Ryan Hotel, Grand Forks, North Dakota, on Saturday, October 21, 1939.

The following program has been arranged by Dr. W. A. Liebeler, Grand Forks, North Dakota, Chairman of the Program Committee:

1. A Fifteen Year Review of Carcinoma of the Cervix Uteri at St. John's Hospital, Fargo, North Dakota, by J. F. Hanna, M.D., Fargo.
2. Medical Induction of Labor Near Term, by John D. Graham, M.D., Devils Lake.
3. Pyelitis in Pregnancy: Report of Cases, by H. Robert Ransom, M.D., Grand Forks.

The guest speaker, who will address the dinner meeting of the society will be Dr. Lawrence M. Randall of the Mayo Clinic, Rochester, Minnesota. His subject will be "Some Clinical Phases of Endocrinology."

PHYSICIANS WANTED FOR CCC DUTY

Medical service for the Civilian Conservation Corps has, in the past, been furnished by the medical section of the Officers' Reserve Corps with the exception of a few doctors who were employed on a contract basis. A recent decision of the Director of the CCC and the War Department permits the employment of doctors who are not Medical Reserve officers in this service.

Doctors needed for this service may now be employed under the rating of civilian employees or on a contract basis, the initial pay being $2600 per annum. No quarters for families are provided, and the doctor will be required to pay for his food at camps. Temporary quarters for the doctor will be provided at the camps for a nominal fee. Doctors selected for this service will be required to pay their own travel expenses to the nearest district headquarters, where they will be put on temporary duty for instructional purposes before being sent to camps. Travel expenses incurred in the transfer of doctors from the district headquarters to camps or in the transfer from one camp to another will be paid by the Government. If the services rendered are satisfactory, the employment is more or less permanent.

The principal duties at camps consist of the medical care of the enrollees and the practice of preventive medicine. To be eligible for this service, the doctor must be legally qualified to practic medicine and physically able to perform the duties involved.

All doctors interested in this type of service are requested to submit their applications to the office of the Surgeon, Headquarters Seventh Corps Area, Federal Building, Omaha, Nebraska, giving date when available and preference of assignment in the following states: Minnesota, North Dakota, South Dakota, Iowa, Nebraska, Missouri, Kansas, and Arkansas.



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News Items

Dr. James Morrow, Austin, is the new president of the Southern Minnesota Medical association. Other officers are: Dr. Charles Koenigsberger, Mankato, first vice-president; Dr. E. A. Kilbride, Worthington, second vice-president; Dr. N. W. Barker, Rochester, secretary-treasurer.

Dr. David A. Sher who practiced at Cold Spring, Minnesota for the past four years, has opened an office at Austin.

Dr. Charles McLachlan of New Rockford, North Dakota, former Dunseith Sanatorium head, was recently honored by fellow physicians on the occasion of his 50th year of practice.

Dr. Owen Parker, Ely, was elected president of the North Minnesota Medical association at the annual convention, September 9, 1939. Other new officers are Dr. W. T. Wenner, St. Cloud, vice-president, and Dr. Clarence Jacobson, Chisholm, secretary and treasurer.

Dr. M. Vik, Onamia, was elected president of the Eastern Minnesota Medical association recently.

Dr. G. W. Clifford, formerly of Osakis has opened an office in Alexandria, Minnesota.

Dr. Ralph Vinje, formerly of Ada, Minnesota, has taken over the practice of Dr. P. F. Rasmusson in Beulah, North Dakota. Dr. Rasmusson has retired.

Dr. Elmer E. Keithahn, Fairmont, Minnesota, has become associated with Dr. George E. Sherwood at Kimball, Minnesota.

With Dr. Gordon R. Kammann, St. Paul neuropsychiatrist as its chairman, an advisory committee of specialists has been appointed to assist with formation of a program for handling Minnesota's feeble-minded and epileptic problem. Serving with Dr. Kammann are the following physicians: Dr. Max Seham, Dr. J. C. McKinley, Dr. Royal C. Gray, Dr. D. E. McBroom and Dr. E. J. Engberg.

The new superintendent of the San Haven, South Dakota, state tuberculosis sanatorium is Dr. Cedric Northrup of Dallas, Oregon. He succeeds Dr. G. Alfred Dodds.

Dr. J. O. Arnson, Bismarck, North Dakota, has been appointed physician of the state penitentiary. He succeeds Dr. M. W. Roan, also of Bismarck.

The Minnesota Medical Alumni Association will meet on October 14 at 9 a. m. in the Eustis Amphitheater of the University Hospital in conjunction with the program for the commemoration of the fiftieth anniversary of the founding of the Medical School. A group of clinics has been arranged by Dr. William A. O'Brien, to be presented by Doctors Adson, Wangensteen, Barnes, McKelvey, Snell, and Watson. This program will be followed by the annual luncheon meeting, compliments of the University Hospital, when the revised constitution will be presented for adoption.

Dr. Harold F. Buchstein has returned to Minneapolis and has opened offices for the practice of neurological surgery. Dr. Buchstein was formerly a fellow on neurosurgery at the Mayo Foundation and more recently honorary research fellow at Yale University.

Dr. R. O. Goehl of the Healy, Law and Woutat Clinic of Grand Forks, North Dakota, was recently certified by the American Board of Internal Medicine.

Necrology

Dr. Henry O'Keefe, 84, of Grand Forks, North Dakota died in a St. Paul, Minnesota, hospital Sept. 2, 1939. He had practiced in Grand Forks the past 33 years.

Dr. Harry Clay Smith, 67, of Missoula, Montana died September 13, 1939. He had practiced in Missoula since 1904.

Dr. M. C. Schenecker, 80, pioneer doctor of Webster, South Dakota, died September 4, 1939. Dr. Schenecker came to Day county in 1885, settling at Bristol where he resided until 1907 when he came to Webster.

EXAMINATIONS

American Board of Obstetrics and Gynecology

The next written examination and review of case histories (Part I) for Group B candidates will be held in various cities of the United States and Canada on Saturday, January 6, 1940, at 2:00 P. M. *The Board announces that it will hold only one Group B, Part I, examination this year prior to the final general examination, instead of two as in former years.* Candidates who successfully complete the Part I examination proceed automatically to the Part II examination held in June 1940.

Applications for admission to Group B, Part I, examinations must be on file in the Secretary's office not later than October 4, 1939.

The general oral and pathological examinations (Part II) for all candidates (Groups A and B) will be conducted by the entire Board, meeting in Atlantic City, N. J., on June 8, 9, 10, and 11, 1940, immediately prior to the annual meeting of the American Medical Association in New York City.

Applications for admission to Group A, Part II examinations must be on file in the Secretary's office not later than March 15, 1940.

After January 1, 1942, there will be only one classification of candidates, and all will be required to take the Part I examinations (written paper and case records) and the Part II examinations (pathological and oral).

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

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Advertiser's Announcements

ANNUAL I. M. A.

This year's International Assembly of the Inter-State Postgraduate Medical Association of North America will be held in the Palmer House, Chicago, Illinois, October 30, 31, November 1, 2 and 3.

The high standing of its medical profession, combined with the unusual clinical facilities of its great hospitals and excellent hotel accommodations, make Chicago an ideal city in which to hold the Assembly.

The members of the profession are urged to bring their ladies with them as a very excellent program is being arranged for their benefit by the Ladies' Committee. Chicago has many places of interest, which will make this year's program especially attractive to them.

The Chicago Medical Society will be host to the Assembly and has arranged an excellent list of committees who will function throughout the Assembly.

The program which has been arranged by the program committee is most excellent and meets the requirements of the general practitioner, as well as the specialist.

It consists of in the neighborhood of eighty clinics and addresses covering the latest advancements in medical science. The contributors have been selected from among the most outstanding teachers and clinicians of North America.

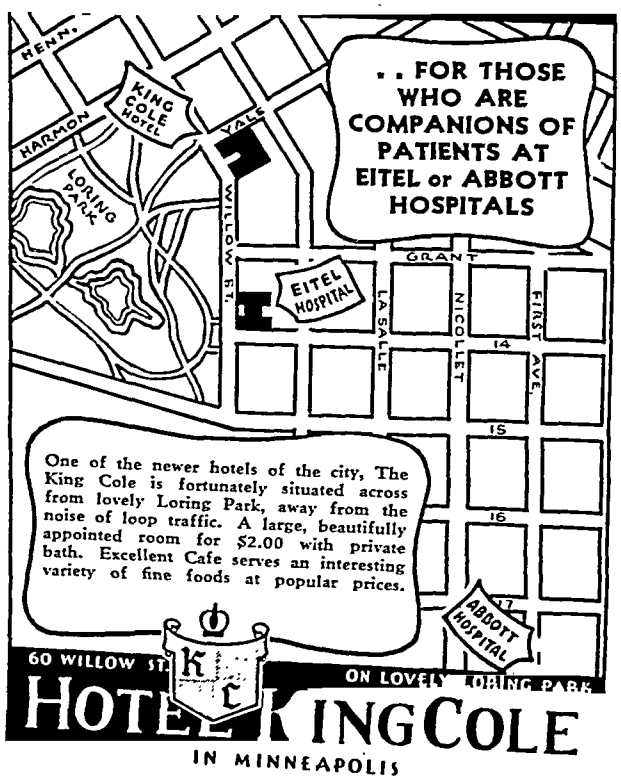
The registration fee of $5.00 admits all members of the *profession in good standing.*

Pre-assembly and post-assembly clinics will be conducted in the Chicago hospitals the Saturdays previous and following the Assembly for visiting members of the profession.

BLOOD TRANSFUSION: ACACIA SOLUTIONS

The establishment of "banks" of refrigerated blood is at present increasing the widespread availability of blood transfusions, but considerable time must elapse before the number of dependable depots of stored blood will be sufficient for the country as a whole, particularly in rural areas. Randall and Hunt (Am. J. Obst. & Gynec., 37:819, May, 1939) feel that their experience since 1929, based on observations of 4900 obstetrical patients, 93 of whom required treatment for shock and hemorrhage, indicates that 6 per cent acacia solution in normal saline is a suitable substitute for whole blood where the latter is not obtainable.

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The preparation and technic of injection of acacia solutions are of great importance. From 25 to 40 cc. of solution are given each minute. The smallest amount administered in the authors' cases was 300 cc. and four patients received 1,000 cc. or more.

Ampoules Acacia, Lilly, are supplied with or without sodium chloride. Each ampoule contains 30 Gm. acacia in 100 cc. When diluted to 500 cc. with sterile, freshly distilled water, a 6 per cent solution of acacia is immediately available for injection during emergencies.

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Riboflavin (Vitamin B_2 or G) is now being supplied by E. R. Squibb & Sons, New York, in synthetic form for oral use in capsules containing 1 milligram, or approximately 400 Bourquin-Sherman units each. The capsules are packaged in bottles of 25.

Necessary for animal growth, a deficiency causing loss of hair, dermatitis and sometimes cataract in rats; in humans a lack of which has been reported to cause a chapped condition of the lips (cheilosis), a contributing factor in the development of pellagra, Riboflavin is said to be "a component of an oxidation enzyme" which performs a very vital function in the body of every animal—that is, it takes an active part in tissue respiration.

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The average daily requirement of Riboflavin for an adult is estimated to be from 2 to 3 milligrams or more, as prescribed by a physician. Riboflavin Squibb is biologically standardized, assayed by the Bourquin-Sherman method.

HOW TO GIVE COD LIVER OIL TO A BABY

Some authorities recommend that cod liver oil be given in the morning and at bedtime when the stomach is empty, while others prefer to give it after meals in order not to retard gastric secretion. If the mother will place the very young baby on her lap and hold the child's mouth open by gently pressing the cheeks together between her thumb and fingers while she administers the oil, all of it will be taken. The infant soon becomes accustomed to taking the oil without having its mouth held open. It is most important that the mother administer the oil in a matter-of-fact manner, without apology or expression of sympathy.

If given cold, cod liver oil has little taste, for the cold tends to paralyze momentarily the gustatory nerves. As any "taste" is largely a metallic one from the silver or silverplated spoon (particularly if the plating is worn), a glass spoon has an advantage.

On account of its higher potency in Vitamins A and D, Mead's Cod Liver Oil Fortified With Percomorph Liver Oil may be given in one-third the ordinary cod liver oil dosage, and is particularly desirable in cases of fat intolerance.

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Inter-State Postgraduate Medical Association of North America

Palmer House, Chicago, Illinois — **Oct. 30, 31, Nov. 1, 2, 3, 1939**

Pre-Assembly Clinics, October 28; Post-Assembly Clinics, November 4, Chicago Hospitals

President, Dr. George W. Crile
President-Elect, Dr. Chevalier Jackson
Chairman, Program Committee, Dr. George W. Crile
Managing-Director, Dr. William B. Peck
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If any member of the profession in good standing does not receive a program, please write the Managing-Director at once and a copy will be mailed.

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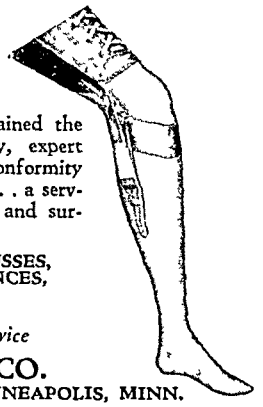
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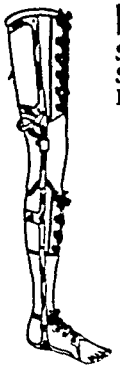
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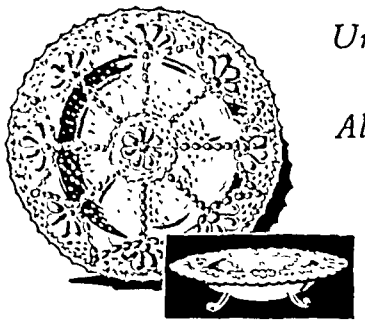
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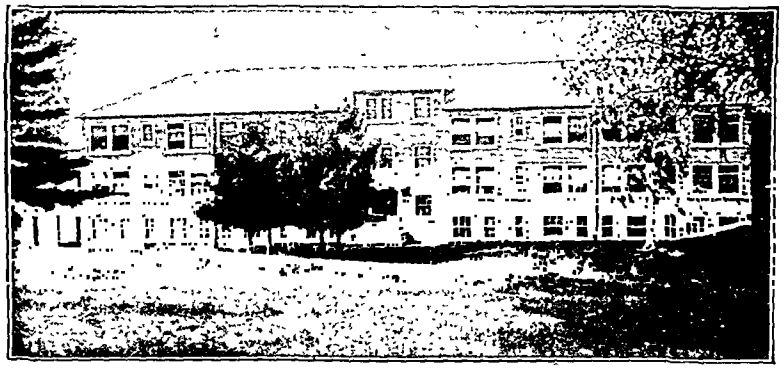
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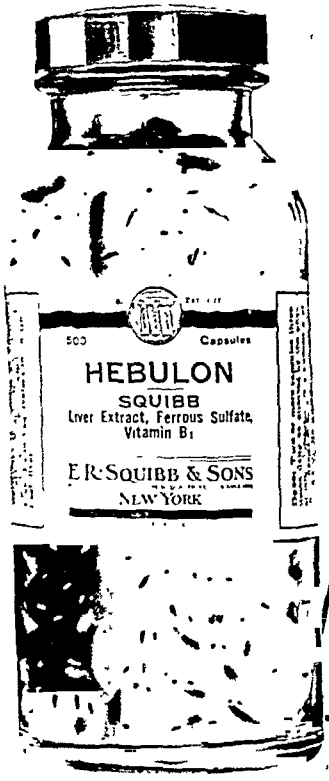
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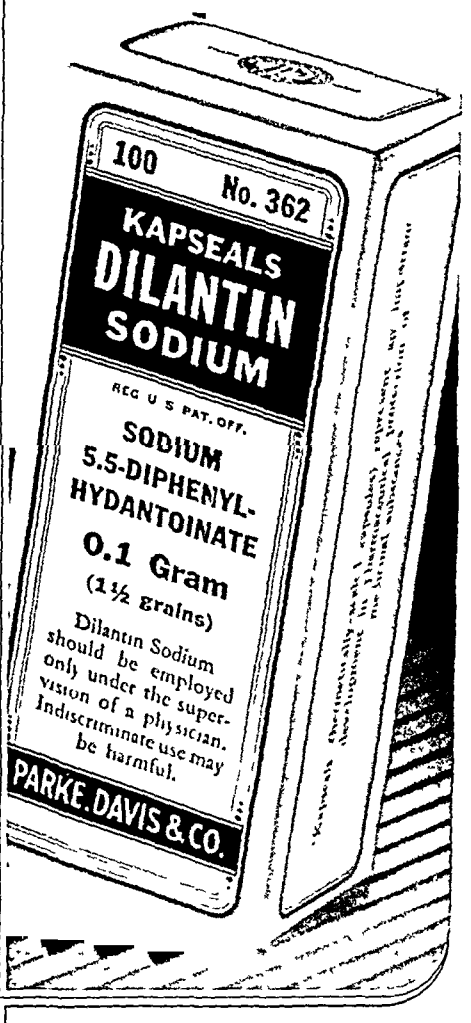
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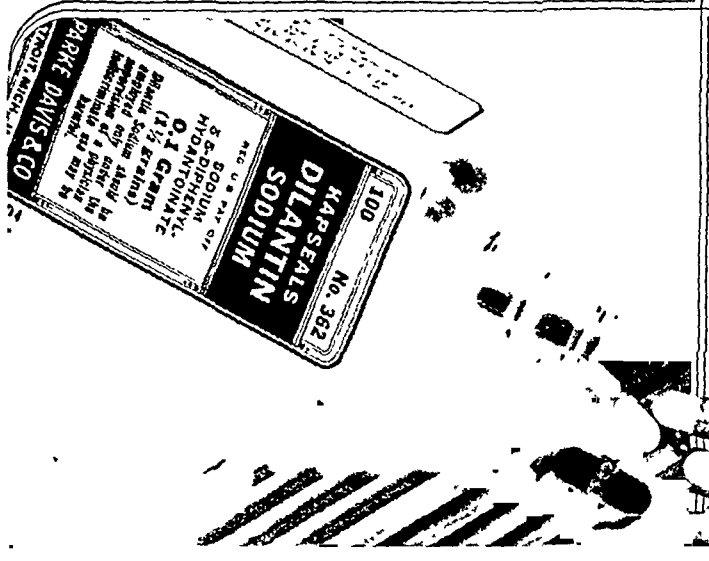
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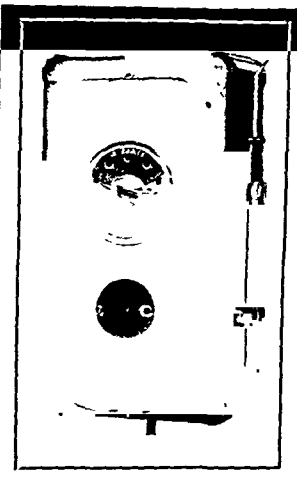
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ADM NUTRITION REVIEWS

VOL. 1 SEPTEMBER, 1939 NO. 3

PINK DISEASE AND WHEAT GERM OIL

Among the recognized constituents of the so-called vitamin B complex there is included an anti-acrodynia or rat anti-dermatitis factor more commonly designated vitamin B_6.

Properly prepared wheat germ oil is seemingly the richest natural food source of this factor which is not alone related to acrodynia, but is involved also in the cure of nutritional macrocytic anemia in monkeys and is therefore apparently related to normal blood formation.

The experimental work which led to the differentiation of the pellagra preventing factor from flavin and from the anti-acrodynic factor in the vitamin B complex was aided materially by two discoveries. First, the demonstration that commercial liver extract prepared for the treatment of pernicious anemia was quite efficacious in curing human pellagra. Secondly, the recognition, isolation and synthesis of riboflavin.

Goldberger and Sebrell (1) found liver extract to be a good source of the factor necessary for the prevention of black tongue in dogs. Spies (2) and Smith and Ruffin (3) observed that fairly large amounts of liver extract furnished by mouth were efficacious in treating human pellagra. Remsdell and Magness (4) noted that the intramuscular administration of liver extract resulted in some clinical improvement, but Ruffin and Smith (5) could obtain no beneficial effects from 5 cc of parenteral liver extract. Spies (6), shortly after this work demonstrated that either the intravenous or the intramuscular administration of large amounts of potent liver extract caused a remission of the oral manifestation of pellagra.

Elvehjem (7) working at Cambridge became convinced from the work of Guha that liver extract might be an excellent material for the isolation of the anti-pellagra factor. Attempts to produce typical pellagra-like lesions in rats failed and Elvehjem turned his attention to chicks. Norris and Ringrose (8) had reported the development of a pellagrous-like syndrome in chicks placed on a normal diet except for use of powdered egg albumen in place of the more common protein of animal origin. When purified casein was used instead of the egg albumen, the onset of symptoms was delayed but there was no improvement in growth. The addition of 5 per cent of autoclaved yeast prevented the symptoms on both rations and produced good results in the matter of growth.

Kline, Keenan, Elvehjem and Hart (9) produced symptoms quite similar to those reported by Norris and Ringrose in chicks that had been reared on a ration of natural foodstuffs but heated dry at 95 to 100 degrees C., for 144 hours. The symptoms that appear are observed chiefly at the eyes, the corners of the mouth, and upon the legs and feet. The feathering is retarded, and the feathers become ruffled because the birds pick themselves continually. Crusty scabs which develop at the corners of the mouth gradually enlarge and often involve the margins of the skin around the nostrils and underneath the lower jaw. When such rations are supplemented with liver extract, no symptoms develop and good growth results.

Additional work provided ample evidence that flavin has no direct relation to human pellagra, canine black tongue, nor chick pellagra, although it does have other biological activities.

Gyorgy (10) observed pellagra-like dermatitis in rats on Borquin and Sherman diet supplemented with vitamin B_1 and flavin. The dermatitis was cured by a supplementary factor present in the eluate from a Fuller's earth adsorbate from yeast. The term vitamin B_6 was suggested for this factor and all workers now agree to the use of this term for curing the florid type of dermatitis.

PINK DISEASE

Ormsby (11), under the term erythredema, synonymously includes acrodynia, dermato-polyneuritis, or erythredema-polyneuritis and Pink Disease. He also separately lists acrodynia as synonymous with erythema-epidemicum and describes it as a disease said to be closely allied to pellagra and ergotism.

MacKenna (12) appears to distinguish between acrodynia and pink disease by stating that in both diseases the symptoms with regard to the hands and feet are similar, but acrodynia only affects adults, occurs in epidemics and according to MacKenna may only be a form of chronic arsenical poisoning; whereas pink disease does not affect adults, it is a sporadic disease of infancy in early childhood with an apparently increasing incidence and with no evidence to show whether it is contagious or infectious.

According to MacKenna, authorities consider pellagra and pink disease associated, the most probable suggestion being that although pink disease may appear in breast-fed children, it is nevertheless a deficiency syndrome.

The empiric treatment of acrodynia, as of pink disease, while unsatisfactory, has centered around the attempt to keep up nutrition through proper diet supplemented by symptomatic control of the symptoms as they develop. According to Ormsby, Crawford recommends food rich in vitamins A and

TABLE 1

THE ANTI-ACRODYNIC POTENCY OF FOODS

	Minimum Curative Level (MG./Day)	Maximum Failing Level (MG./Day)	Units per 100 GM.	Wilson and Roy Values (Recalc.)
Green leafy vegetables.				
1. Lettuce	4000	1500	25	77
2. Spinach	1500	1000	66	53
Vegetables				
3. Tomato	4000	1500	25	42
4. Potato (dried)	500	300	200	
(calc. as fresh)	2500	1500	40	75
5. Carrot	4000	1500	25	
6. Beet (red)	7500	5000	13	
Fruits				
7. Banana	1500	500	66	
8. Orange	6000	5000	16	23
9. Apple	5000	4000	25	57
Legumes, seeds, cereals				
10. Alfalfa leaves	170	40	600	
11. Beans (navy)	250	20	400	
12. Peanuts	60	30	1660	
13. Soybeans	80	60	1250	
14. Cornmeal	250	200	400	
15. Whole wheat bread	250	200	400	
16. Oat meal	300	250	330	
17. Flaxseed	100	80	1000	
18. Rice polishings	200	150	500	
19. Wheat germ	80	60	1250	
Animal products				
20. Egg white (boiled, dried)	....	500	....	
21. Egg yolk (boiled, dried)	40	10	2500	
22. Whole milk	2500	....	40	
23. Skim milk	7000	5000	14	
24. Cheese (Cheddar)	400	300	250	
25. Beef muscle (raw, dried)	800	500	125	
26. Beef muscle (roasted, dried)	800	500	125	
27. Haddock (dried)	500	150	200	
28. Pork liver (dried)	200	80	500	
Fats (animal)				
29. Beef tallow	300	20	330	
30. Butterfat	500	200	200	
31. Chaulmoogra oil	....	40	....	
32. Cod liver oil	....	40	....	
33. Lard	40	....	2500	
Fats (plant)				
34. Coconut oil	200	100	500	
35. Coconut oil (hydrogenated)	....	200	....	
36. Linseed oil (comm.)	40	20	2500	
37 Linseed oil (crude)	40	20	2500	
38 Linseed oil (refined)	....	40	....	
39 Linseed oil (hydrogenated)	....	100	....	
40. Peanut oil (ether ext.)	20	10	5000	
41. Peanut oil (benzine ext.)	20	....	5000	
42. Peanut oil (crude)	40	20	2500	
43. Rice oil (comm.)	40	20	2500	
44. Rice oil (ether ext.)	20	....	5000	
45. Soybean oil (ether ext.)	10	....	10000	
46. Soybean oil (ether ext.)	15	....	7500	
47. Tung oil	....	40	....	
48. Cottonseed oil (comm.)	10	5	10000	
49. Corn oil (comm.)	5	3	20000	
50. Wheat germ oil (comm.)	4	2	25000	
51. Wheat germ oil (ether ext.)	7	....	15000	
Miscellaneous				
52. Yeast (dried)	250	200	400	506

B together with abundant orange and tomato juice, yeast and cod liver oil. This is clearly polypharmaceutical vitamin therapy, where by an assortment of foods an attempt is made seemingly to include an abundance of the vitamin B complex such as would be furnished more particularly by yeast.

The same author states that Wyllie and Stern add raw liver to the dietary with quite satisfactory results, and liver has already been identified as a source of various of the vitamin B components.

There is yet no final proof that rat acrodynia and human pink disease or human acrodynia have a common origin in vitamin B_6 deficiency. However, there are many points of resemblance not only in the symptoms but more particularly in the empiric fashion in which human pink disease and human acrodynia have been treated with vitamin supplements and the prevention and cure produced in rats by similar feeds now known to be rich sources of vitamin B_6.

Schneider, Ascham, Platz and Steenbock [13] have supplied the need for a survey of the anti-acrodynic potencies of various foodstuffs. Notwithstanding the fact that these investigators have only temporarily relieved acrodynia in their laboratory through the use of crystalline vitamin B_6, thus suggesting that their assay of anti-acrodynic potency cannot be interpreted solely as evidence of the amount of vitamin B_6 present in the food, nevertheless their study of the distribution of the anti-acrodynic factors determined by biological assay has much practical importance.

The technique of the assay used for the determination of the potency of various foods is that outlined by Quackenbush, Pratt and Steenbock [14], in which weanling rats, reared by mothers on a potato diet low in the anti-acrodynic factor, were transferred to a basal diet of cerelose 78, casein (alcohol extracted) 18, and Wesson Salts 4. Each rat was given in addition a daily supplement of 5 micrograms of calciferol and 10 micrograms of beta carotene in one drop of the liquid portion of hydrogenated coconut oil, plus 20 micrograms of riboflavin and 10 micrograms of thiamin hydrochloride in one drop of N/50 normal acetic acid. The only components of the B complex which were supplied by this diet, designated diet V by these investigators, were riboflavin and thiamin. On such diet, acrodynia developed for these investigators in from four to five weeks with their animals.

The investigators state that whether the potency of fats is to be attributed to an actual vitamin B_6 content or otherwise cannot be answered at the present time, although Kuhn and Wendt [15] have recorded that the vitamin B_6 molecule contains 2 alcoholic and one phenolic group which would make an ester form of the vitamin at least a possibility. However, Birch, Quackenbush, Platz and Steenbock have traced the potency of fats to the unsaturated acid fraction (sometimes called vitamin F). Salmon [16] likewise obtained cures with certain fats and fatty acids. Birch [17] suggested that the unsaturated fatty acid factor is necessary for a cure of dermatitis in addition to vitamin B_6 on the basis that where vitamin B_6 fails to cure alone, the addition of unsaturated fats made a cure possible. Thus, it would appear that wheat germ oil is not only an exceptionally rich and potent source of the anti-acrodynic factor, but that its effectiveness is aided greatly by its well known outstanding richness in the essential unsaturated fatty acids sometimes called vitamin F [18].

While it is thought that the findings for human nutrition are as yet undemonstrated, it must be remembered that apart from the rat the other species for which vitamin B_6 has been indicated to be essential includes the dog, according to Fouts, Helmer, Lepkovsky and Jukes [19], the pig according to Chick, Macrae, Matrin and Martin [20], and if the empirical treatment for acrodynia as recorded by dermatologists of renown is any indication, it may be assumed tentatively that vitamin B_6 is related also to the cure and prevention of pink disease in the human.

EMPIRIC TREATMENT OF PINK DISEASE WITH WHEAT GERM OIL

Pink disease has never appeared in babies born of mothers that have been wheat germ oil surfeited to insure a proper normal gestation following the saturation method of Shute [21]. To be sure, insufficient cases have accumulated to permit of a significant statistical array of the findings; but the few cases that have been observed are so strikingly outstanding as to suggest that pink disease in the human infant can be prevented by supplying the expectant mother liberally with saturation doses of wheat germ oil throughout the gestation period.

Aside from the effect of the vitamin E complex, which is characteristic of wheat germ oil, the saturation of the expectant mother with wheat germ oil furnishes at the same time the richest known natural source of the unsaturated fatty acids commonly called vitamin F, and the richest known natural source of the anti-acrodynic vitamin B_6. Since the work of Birch who suggested that the physiological function of vitamin B_6 is connected with the utilization of the unsaturated fatty acids (vitamin F), and who has presented evidence to show that two factors are concerned in the production and cure of the acrodynia-like dermatitis of experimental animals, it seems advisable now to repeat the work of Hansen [22] [23] [24] on the prevention and treatment of infantile eczema. Hansen suggested the use of oils known for their unsaturated fatty acid richness, such as linseed oil, corn oil and others. It is now known that wheat germ oil exceeds

any other known vegetable oil in this richness; and, differing from the other vegetable oils mentioned it is at the same time the richest known source of vitamin B_6. Thus, the Shute saturation of the expectant mother with large doses of wheat germ oil is not only beneficial to insure the normal course of uncomplicated pergnancy, and the reduction to a minimum of any of the abnormal deviations that can appear in the course of gestation, but also through the liberal supply of vitamin F or unsaturated fatty acids and vitamin B_6 which are exceedingly abundant in wheat germ oil which seemingly supplement one another in developing the effectiveness of each, it is almost certain that refractory infantile eczema and the equally stubborn *pink disease can in a large measure be prevented* from appearing in the new born child.

A rule which seems to be uniformly effective is to furnish for the saturation dose the equivalent of 1/2 ounce of cold pressed wheat germ oil for every hundred pounds of body weight of the patient in the case of adults. In the case of children the proportion is increased to exactly double the amount—one ounce of wheat germ oil for every hundred pounds of body weight of the infant or child.

This saturation can be practiced before pregnancy, immediately following pregnancy, and one or two times during the gestation period. It is supplemented between saturation doses with 1/8 to 1/4 ounce of wheat germ oil, cold pressed, each day to maintain the saturation at the highest physiological level of activity.

SUMMARY AND CONCLUSION

Wheat germ oil, properly prepared, is not only an excellent source of vitamin E complex, including alpha, beta, gamma and perhaps other tocopherols, but is also a rich source of the unsaturated fatty acids which have been called vitamin F.

In addition to its outstanding potency in respect to natural vitamin E and to so-called vitamin F (the unsaturated fatty acids) wheat germ oil is also the best known natural food source of vitamin B_6.

Vitamin B_6 has been designated the anti-acrodynic vitamin.

Pink disease in the infant or child, and acrodynia in the adult, or both, are seemingly identified with the syndrome which develops in experimental animals deficient in vitamin B_6.

It has been suggested that vitamin B_6 and the unsaturated fatty acids mutually assist each other in the prevention and cure of certain skin manifestations, in which synergistic action wheat germ oil is exceptionally unusual by reason of its richness in both the unsaturated fatty acids and vitamin B_6.

Acrodynia in adults, if due to vitamin B_6 deficiency, should respond similarly to saturation and maintenance doses of cold pressed wheat germ oil.

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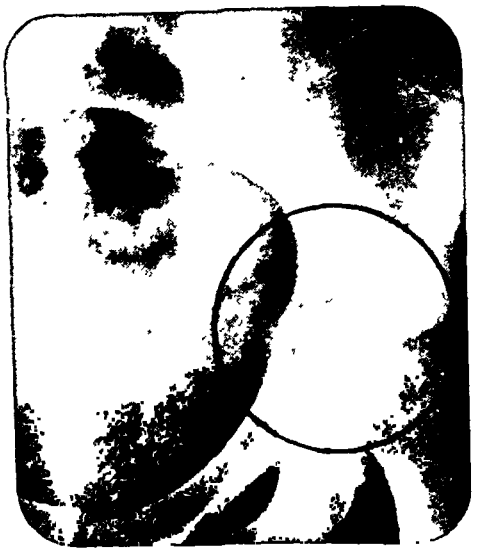
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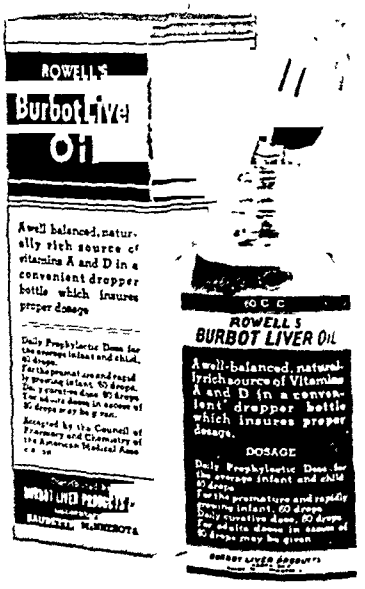
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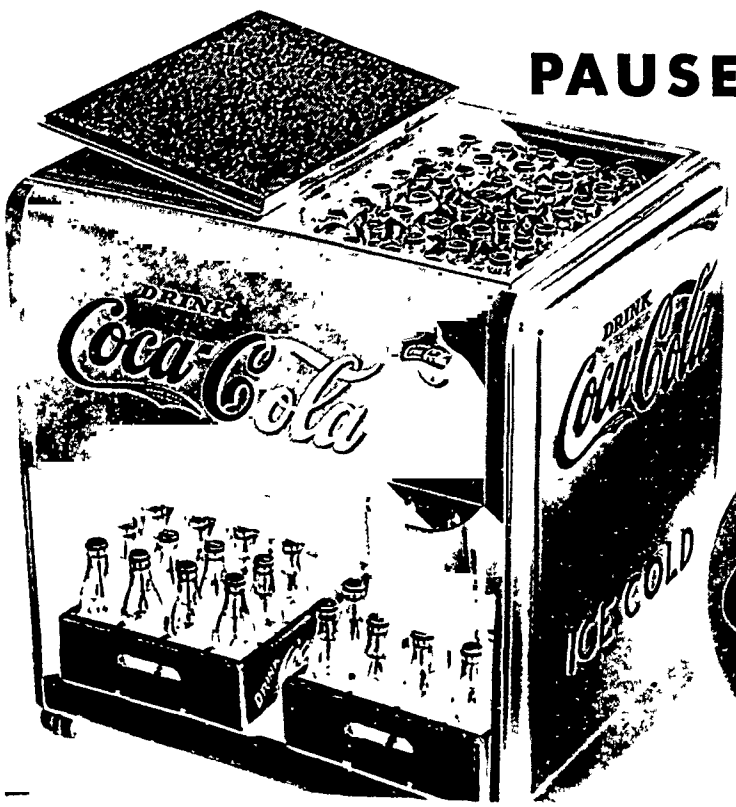
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Sixty-First Annual Session

Butte, Montana

June 28 — July 1, 1939

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MINUTES OF COUNCIL AND HOUSE OF DELEGATES MEETINGS

Held at Finlen Hotel

The Council Meeting, held on June 28, 1939, at the Finlen Hotel, Butte, Montana, at 4:30 P. M., at the annual session of the Montana State Medical Association, was opened by the President, Dr. J. C. MacGregor.

After the Secretary had ascertained a quorum was present, the meeting was open for business.

The minutes of the last Council Meeting were read and approved as read.

The Secretary presented the financial report of the Treasury and indicated in his report that it would be necessary to raise the dues to at least $8.00 in order to prevent the use of invested funds of the Association. After a thorough discussion of the subject, Dr. J. H. Garberson made a motion, which was seconded by Dr. M. B. Hesdorffer, that the Council recommend that the dues be raised to $8.00 per annum.

The next business to come before the Council was that of an official journal for the Association. Dr. Stewart, a member of the Editorial Board of the JOURNAL-LANCET, talked on the JOURNAL-LANCET and presented the various activities. He outlined the structure of the JOURNAL-LANCET Editorial Board and the policy, including the active participation of the Montana State Medical Association in the future activities.

The Secretary informed the Council that it would be necessary for them to nominate and appoint an attorney for the ensuing year. Dr. P. E. Kane made a motion which was seconded by Dr. H. W. Gregg that Mr. E. G. Toomey be retained for the year at the same salary of $300.00 a year.

There being no further business the Council adjourned subject to the call of the President.

The Council Meeting, held on June 29, 1939, at the Finlen Hotel, Butte, Montana, at 5 P. M., was called to order by the President, Dr. J. C. MacGregor, and a quorum being present the meeting was open for business.

The President discussed the organization known as the "Pacific Medical Executives" and stated that the purpose of the organization was a closer relationship between the various State Associations in dealing with Federal families on relief, medical-legal defense, malpractice insurance and other medico-economic subjects. After a thorough discussion of the matter, a motion was made, seconded, and passed that Montana enter into such an Association.

The President appointed an auditing committee of Drs. J. H. Garberson, P. E. Kane, and L. T. Sussex, to audit the report of the Secretary-Treasurer. The Committee reported favorably and moved that the report of the Secretary-Treasurer be accepted.

Dr. Garberson spoke at length on the annual registration and the necessity of amending the Medical Practice Act. After discussing the matter, a motion was made, seconded, and passed that the Executive Committee, with other members, be empowered to devise an annual registration fee law and to suggest such necessary amendments of the Medical Practice Act.

There being no further business the meeting of the Council adjourned subject to the call of the President.

The House of Delegates of the Montana State Medical Association was called to order by the President, Dr. J. C. MacGregor, at the Finlen Hotel, Butte, Montana, on June 30, 1939, at 9:00 P. M.

The credentials of the various delegates were examined by the Secretary and found to be in order.

A quorum being present, the meeting was open for business.

The minutes of the last meeting were read and accepted as read.

The President appointed a Resolution Committee, consisting of Drs. T. J. B. Shanley, Chairman, S. A. Cooney, and L. L. Maillet, with the request that they report on July 1, 1939.

A Necrology Committee, consisting of Drs. J. K. Coleman and Thos. F. Walker was appointed by the President, with the request to report on July 1, 1939.

The report of the Secretary-Treasurer was read and adopted as read.

The report of Dr. J. H. Irwin, official delegate of the Montana State Medical Association to the American Medical Association Meeting, was read and accepted as read.

Dr. S. A. Cooney reported on the Legislative Committee and Dr. J. H. Garberson opened a discussion on the necessity for revising the Medical Practice Act. A motion was made, seconded, and passed that a Committee be appointed to work with the Executive Committee to submit recommendations for the revision of the Medical Practice Act and an annual registration fee to be approved by the County Societies and to be acted upon by the House of Delegates at the next annual meeting.

Dr. Frank McPhail, Chairman of the Maternal and Infant Welfare Committee, reported at length. (It is the opinion of the Secretary that this report should be printed and sent to all members of the Association.) A motion was made, seconded, and passed that the report be adopted. The report in detail submitted the following proposals for the approval of the House of Delegates: First, that the House of Delegates approve a study of hospital births and cooperate with a Committee appointed from the Montana Hospital Association; Second, a survey of all births in Montana; Third, the approval of the new birth certificate as recommended by the American Committee on Maternal Welfare; Fourth, that the House of Delegates approve of occasional state-wide conferences on maternal and infant care; these conferences to be put on by

physicians and hospital authorities, public health nurses, and lay organizations interested in this phase of public health; and Fifth, the approval of a more complete use of the public health nurse. (For details see Committee Report.)

A proposal was made to amend Section 1, Chapter 4, of the By-Laws to read as follows: "The House of Delegates shall meet during the Annual Session of the Association and at such other times as necessity may require, subject to the call of a majority of the Executive Committee or on petition of ten delegates, representing at least three component medical societies." Final action on this proposal to be taken on July 1, 1939.

Dr. Tom Moore, Delegate from Flathead Medical Society informed the House of Delegates that he had been instructed by his Society to request the re-adoption of Sectional Postgraduate Meetings. It was brought out in his suggestion that the speakers available through the State Board of Health be under the jurisdiction of the Committee on Maternal and Infant Welfare and that these meetings be entirely under the jurisdiction of the local county medical society and the Committee on Maternal and Infant Welfare.

A motion was made, seconded and passed that the Executive Committee be empowered to deal with the JOURNAL-LANCET to contract for an official publishing organ for the Association.

Dr. R. F. Peterson reported as Chairman of the Cancer Committee. A motion was made, seconded, and passed that the report be adopted.

Dr. J. K. Coleman made the report for the Orthopedic Committee. In making the report six proposals were presented to the House of Delegates for their consideration. These proposals were in response to a questionnaire sent to the members of the Committee by the Secretary; the first question being "Do you believe an internist or pediatrician should be available for the care of orthopedic patients while in the orthopedic center?" The Orthopedic Committee suggested that such a person be made available by his appointment and the limits of his service be kept at the discretion of the orthopedic surgeon himself. The House of Delegates did not concur on this opinion. The second question was "Do you believe that this consultant should be selected by the orthopedic surgeon; if not, how should he be selected?" There being no vote by the House of Delegates on this question, the proposal was not accepted. The third question was "How should the consultant be remunerated, by the case, or by the visit?" There being no vote on this proposal, the House of Delegates did not concur. The fourth question was "In cases requiring the attention of the physician following the return home of a patient, would it be practicable to instruct the family physician as to the type of service required and for him to present his bill for services to the orthopedic surgeon, who would endorse and present it to the orthopedic office for payment?" The Orthopedic Committee recommended that this policy be adopted and the House of Delegates concurred in their action. The fifth question was "In the event of the development of a non-orthopedic condition in the patient while under orthopedic care, should the family physician be compensated for his services by the Welfare Board?" The Orthopedic Committee recommended that the family physician should be compensated for by the State Department provided the complication is related to the orthopedic problem. All disassociated illnesses should be handled as they would have been handled if the cases had not been once under orthopedic care. The House of Delegates concurred in this decision. The sixth question was "It has been implied that a Medical Advisory Committee to the Orthopedic Division of the Welfare Board would be welcomed. Do you believe this committee should be composed of only physicians, not designated as orthopedic surgeons?" The Orthopedic Committee recommended that there should be a committee of at least three, one of whom should be an orthopedic surgeon. The House of Delegates did not concur in their recommendation. A motion was made, seconded, and passed that a Medical Advisory Committee be appointed but that no member of the Advisory Committee be physicians who in any manner would themselves or their business associates be eligible for participation in the medical or surgical activities of the Welfare Commission or receiving any fees whatsoever for services from the Welfare Commission.

Dr. Thos. F. Walker reported on the Historical Committee. A motion was made, seconded, and passed that the report be adopted and that $500.00 be advanced to L. L. Callaway for continuation of work.

The Secretary was instructed to write messages extending greetings to Dr. John A. Donovan and Dr. J. A. Evert, absented from the meeting because of illness.

There being no further business, the House of Delegates adjourned subject to the call of the President.

The House of Delegates was called to order at 1:45 P. M. at the Finlen Hotel on June 30, 1939, by the President, Dr. J. C. MacGregor.

Dr. Harold Gregg, Chairman of the Medical Defense Council, reported for the Committee. A motion was made, seconded, and passed that the Committee report be accepted.

A motion was made, seconded, and passed that the annual dues be raised from $5.00 to $8.00 per annum.

A motion was made, seconded, and passed that the Montana State Medical Association affiliate themselves with the Pacific Medical Executives.

At this time, Mr. Stasel of Minneapolis was introduced to the House of Delegates and spoke on "hospitalization."

Dr. F. I. Terrill reported as Chairman of the Tuberculosis Committee and suggested that a Tuberculosis Committee be appointed in each local society. He also spoke at length of the Housing conditions at Galen and the general status of the Tuberculosis State Sanitarium. A motion was made, seconded, and passed that the report be adopted.

A letter was read to the House of Delegates suggesting that a Committee be appointed to draw up resolutions to work for a tuberculosis hospital for the Indians at Billings, Montana. The motion was made, seconded, and passed that the committee be appointed to draw up such resolution.

A report of the legislative Committee was made by Dr. S. A. Cooney. He stated that no legislation had been passed that was detrimental, except to the hospitals, at the last Legislative Session. He opposed the Secretary putting in bills over the head of the Legislative Committee. He recommended the increase of the salaries of the assistants at state institutions.

The Economics Committee made their report through their Chairman, Dr. J. C. Shields. Dr. Shields moved the adoption of the Committee report which was seconded and passed. The Economics Committee reported on what should be the minimum standards for the care of families under the Farm Security Administration. A motion was made, seconded, and passed adopting this report. (For details see Committee report.)

There being no further business, the House of Delegates adjourned subject to the call of the president.

The House of Delegates were called to order on July 1, 1939, at the Finlen Hotel, Butte, Montana, at 9:00 A. M., by the President, Dr. J. C. MacGregor.

A quorum being present, the meeting was open for business.

It was moved, seconded, and passed that the State Association send a resolution to the President and Secretary of War, requesting the appropriation of sufficient funds for the erection of a Medical Library Building in Washington, D. C.

A motion was made, seconded, and passed that the By-Laws be amended in Section 1, Chapter 4, to read as follows: "The House of Delegates shall meet during the Annual Session of the Association and at such other times as necessity may require, subject to the call of a majority of the Executive Committee or on petition of ten delegates, representing at least three component medical societies."

The Executive Committee, in conference with Mr. L. M. Cohen, representative of the JOURNAL-LANCET, agreed that the JOURNAL-LANCET would supply the membership with the publication for a period of three years at a rate of $1.75 per copy.

The place of the meeting in 1940 was discussed and left to the decision of the Executive Committee. An invitation was extended to the Association by the Delegates of Gallatin County Medical Society to meet in Bozeman.

A motion was made, seconded, and passed that the Farm Security Administration deal primarily and first with the State Association in any agreement with Local Societies. It was moved, seconded, and passed that the Economics Committee be empowered to confer with the Farm Security Administration on a Master Plan for the care of families under the jurisdiction of the Farm Security Administration.

A letter was read from Dr. Woodward urging that telegrams be sent opposing the amendment to the Wagner Act. A motion was made, seconded, and passed that the opposition of the House of Delegates to this amendment be sent to the Chairman of the Finance Committee.

It was moved, seconded, and passed that the Executive Committee submit a list of names for appointment to the State Board of Health.

A vote of appreciation was extended to Dr. J. C. MacGregor and Dr. T. L. Hawkins for their work during the last year.

Dr. J. H. Garberson nominated Dr. J. I. Wernham of Billings as President-Elect. The nomination was seconded. A ballot vote cast for Dr. J. K. Wernham. The canvas of the ballot showed that Dr. J. I. Wernham had been unanimously elected as President-Elect.

Dr. R. H. Dyer was nominated by Dr. F. F. Attix as Vice-President. The nomination was seconded. A canvas of the ballots showed Dr. Dyer to be elected unanimously as Vice-President.

Dr. Thos. F. Walker was nominated for Secretary-Treasurer by Dr. Herbert Caraway. The nomination was seconded and ballot vote cast for Dr. Walker. A canvas of the ballot showed Dr. Walker was elected unanimously as Secretary-Treasurer.

There being no further business the meeting was adjourned.

THOMAS L. HAWKINS, M.D.,
Secretary.

REPORT OF DELEGATE TO AMERICAN MEDICAL ASSOCIATION 1939 MEETING, J. H. IRWIN, M.D.

The outstanding event at the meetings of the House of Delegates at the American Medical Association convention at St. Louis this May, was without doubt the consideration, final report and adoption of same, without a dissenting vote by the House of Delegates, of the Wagner Bill. I presume you have read this report as published in the press or in the *Journal of the American Medical Association* and that it would be wasting your and my time to go into it in detail. However, I wish to stress a few of the most important features of it.

The Wagner Bill was considered so important that a Special Committee was appointed to consider it and all matters related thereto, that might be presented to the House for consideration. The committee was composed of some of the ablest men in the House and I can assure you they worked long and arduously in the consideration of same. In fact, there was about twenty hours of open committee meetings to which all interested were invited and urged to attend and present their ideas and many more hours that the committee spent in drawing up their report. Most of you have undoubtedly read the report which was published not only in the *Journal* but in many other medical magazines and daily papers, so I will stress only a few of the most important points.

Resolutions were presented by Iowa and Texas condemning the bill. In the opening statement of analysis of the Wagner Bill, the committee states "although (page 2295) One resolution requesting special representations of women physicians by a special delegate and another requesting special delegate to represent the negro physician were presented and both were disposed of in substantially the same way, that is, women physicians and negro physicians when admitted to the County Medical Society, automatically become members of the State Society and there may be elected to a seat in the House of Delegates." The committee could see no reason to change this procedure.

Immediately after organization, the House of Delegates submitted names of three men, one of whom was to be chosen by ballot for the distinguished service award. Dr. James B. Herrick was elected to receive this honor. This gave me personal gratification as Dr. Herrick was professor of medicine when I was a medical student at Rush and attending physician at Presbyterian Hospital during my internship there.

Following this were addresses by speakers of the House of Delegates, President, and President-Elect. Both gave a very interesting review of acts of the House of Delegates for a period of years past. President I. Abell reviewed developments of the past year, particularly with reference to the meeting with Interdepartmental Committee and the President of the U. S. (Quote page 2171.)

President-elect Rock Sleyster called attention to other medical organizations than the American Medical Association organized purely for scientific purposes, at times assuming to speak on matters of policy and principles affecting the medical profession, certainly a right any individual doctor has as an individual but not as a right to speak for the profession as a whole. Dr. Sleyster further pointed out the commendable work done by the various councils: the cleaning up of advertising pages of medical journals, the improvement of standards of medical schools and hospitals. (Quote page 2162.)

These addresses are all published in the *Journal of the American Medical Association* of May 27 and should be read by all. The report of the Council on Medical Education and Hospital is quite lengthy and should be carefully studied. It is reported in full in the *Journal*. The report of the Committee of Medical care by Dr. Brasch shows result of survey being made by the American Medical Association. I quote page 2177.

Dr. Nathan B. Van Etten of New York was elected president-elect, Dr. Alphonse McMahon of St. Louis, vice-president; Dr. Olin West, secretary and manager. Dr. Herman L. Ketschamer was re-elected treasurer.

REPORT OF COMMITTEE ON MATERNAL AND CHILD HEALTH

To the House of Delegates in meeting at Butte, June 30, 1939, the Committee on Maternal and Child Health begs to submit the following report.

Since public interest has been aroused by our national maternal and infant mortality rates there has been an increasing interest in this subject. Many articles have appeared in the lay press which have been erroneous due to misinformation. However, the aroused public interest has called to the attention of the medical profession matters which should have been studied long ago. In recent years many mortality studies have been made in different parts of the United States. From these studies we find that the responsibility for the health of our mothers and children must be divided between the individual, the community, and the medical profession. During the past two years this Committee on Maternal and Child Health has made a study of the maternal deaths in Montana. In order to understand more completely the conditions influencing maternal and infant mortality, much more information is necessary. For example, we have a considerable Indian population in this state and statistical information should be collected so that the rates among the Indians could be segregated from the rest of the State.

During the past five years there has been a definite reduction in both infant and maternal mortality in Montana. During that time a full time division of maternal and child health was added to our Public Health organization. This department was organized by Dr. Jessie Bierman and since she left, the work has been continued by Dr. Edythe Hershey. Two years ago the present Committee on Maternal and Child Health was appointed by the President of the State Medical Association. This Committee has served in an advisory capacity to the Maternal and Child Health division of the State Board of Health. All maternal deaths have been investigated. However, as the number of deaths is too small to be of statistical value, no report will be made of this study.

The following graphs and tables have been prepared to portray our maternal and infant mortality during the recent years. It is impossible to draw conclusions as to cause of death from these statistics. Further studies are necessary, particularly in regard to live births. It is hardly fair to judge our work solely from the bad results.

Figure 1. The graphs show the infant mortality rate for each one thousand births for the years 1922 to 1937. It will be noted that the rate in Montana is not consistently below that of the United States. The provisional rate for 1938 is 45.2. This is a marked improvement. However, unless this improvement is maintained in 1939, it will not be of great importance.

Figure 2. This graph is included to point out the great loss of life resulting from still-births. While still-births are not included in the infant mortality rates, they represent loss in life. Undoubtedly all still-births are not reported but the still-birth rate remains almost constant.

Figure 3. The age distributions of infants for a ten year period is shown. It will be noted that there has been very little change in the percentage of deaths occurring in the first day and first week of life. Further study indicates that prematurity and birth injury are the important factors causing death. More information must be gathered before suggestions can be made to influence this important cause of death.

Figure 4. This graph shows the maternal mortality rate in Montana as compared with the rate in the United States for the years 1922 to 1937. The rate for the last five years has been consistently below that of the United States. Our maternal mortality study indicates that maternal deaths can be reduced considerably by improving antepartum care and by learning better methods for the care of infections, toxemias, hemorrhages and abortions.

Figure 5. This graph represents the total maternal deaths for each year according to the chief cause of death. It will be noted that in 1937 there were only six deaths from puerperal sepsis as compared with sixteen in 1933. There has been little change in the number of deaths from toxemia or hemorrhage. We may reduce our maternal mortality still more by more active treatment of the toxemias and hemorrhages. Transfusion should be employed regularly and preparation to transfuse should be made on the slightest provocation. The public should be informed of the danger of abortion.

Figure 6. On these maps the infant and maternal mortality is shown for a five-year period. Twenty-seven counties have had fewer than 500 births in the five-year period. The mortality rates in these counties are of no great significance as just one or two deaths will cause great variation in the rates. The counties on the map are shaded to indicate those having mortality rates higher, lower, and the same as the county rate.

Figure 7. Seventeen counties had more than one thousand births in the five years 1933 to 1937. As almost 70 per cent of the births occur in these counties their mortality rate will influence the mortality rate for the State. The average record for each of these counties, whether lower or higher than the state average in both maternal and infant mortality is shown. White squares indicate a rate lower, black squares a rate higher, and shaded squares a rate the same as the state rate. There are still many preventable deaths. If each county were to make a thorough study of conditions, our mortality rates could be lowered considerably.

FUTURE PLAN

In the study of maternal deaths sixteen of the thirty-six physicians replying to the questionnaires sent out by the Committee on Maternal and Child Health, added a note stating that they felt that the death in question could have been prevented had the patient received proper antepartum care. If this is correct, our maternal mortality rate for 1938 could have been 21 instead of the provisional rate of 36 per 10,000 live births.

The Committee on Maternal and Child Health is anxious to make more complete studies of cause of death in both mothers and children. For this we need the cooperation of the entire medical profession. It is for this reason that we wish to present the following proposals to the House of Delegates. We urgently request that these proposals be considered at this time.

The State of Montana occupies an enviable place among the other states of the Union. At the present time we are seventh in maternal mortality and tied for twenty-second in infant mortality. There is a great improvement taking place among other states, and if we wish to hold our standing we also must improve. The Committee plans to continue a study of all maternal deaths, but if we are to accomplish much this study must be broadened. Specific recommendations cannot be made until we know more about the cause of death. The Committee therefore presents the following proposals for your approval:

1. *The Montana Hospital Obstetric Association.* The Montana Hospital Association has appointed a committee to study all hospital births. This will be in the form of a statistical study accumulating records from all hospital births. This study should be perpetual. If the Medical Association approved this study it may be started at once.

2. *A Survey of all births in Montana.* A study of maternal deaths and hospital births, while valuable, leaves much to be learned in regard to the large number of births which occur in the home. If we are to do much to lower the loss of life from prematurity and still-births, we must know more about the conditions affecting these births. Many questions in regard to the economic status, hospitalization, availability of medical care, (particularly true in regard to the osteopath problem) cannot be answered today. The Committee recommends a one-year study of all births in the State. As we have over 10,000 births each year, this will be of great statistical value.

3. The Committee recommends the approval of the new birth certificate recommended by the American Committee on Maternal Welfare.

4. The Committee recommends that the Medical Association reconsider the subject of Refresher Courses. We feel the Refresher Courses on maternal and infant problems should be under the direction of this Committee, and should be given only if requested. Speakers may be obtained from within the State or from the outside as requested. Cooperation of the State Board of Health is desirable.

5. The Committee recommends that the Medical Association approve the idea of an occasional state-wide conference on maternal and infant care. These conferences would be in the form of the joint conference between physicians, hospital authorities, Public Health nurses, and lay organizations interested in this phase of Public Health. A better relationship between the medical profession and the laity is desirable.

6. The Committee recommends the more complete use of the Public Health nurse. It is neither the desire of, nor is it possible for the Public Health Department to practice medicine. It is possible to use the Public Health Nurses' Association to advantage, by having the nurse work under the physician's direction. Antepartum care could be greatly improved, thus having an effect on reducing maternal mortality. Postpartum follow-up would play an equally important role in reducing infant mortality.

7. The Committee urges that the Medical Association continue the study of a proposed radio program discussed at the meeting last year. A better understanding on the part of the laity would be possible. Many people are inclined to look upon the medical profession as obstructionists. A clearer understanding between the laity and the physician would make it possible to practice more preventive medicine. It is in this improved relationship that we have hope of reducing our maternal and infant mortality.

FRANK MCPHAIL, M.D.,
Chairman.

REPORT OF CANCER COMMITTEE

The Cancer Committee of 1938-1939 reports to the House of Delegates of the Montana Medical Society as follows:

1. Most of the work of the year has been done in conjunction with the American Society for Control of Cancer and the Women's Field Army.

2. Each member of the Committee has acted in the capacity of advisor to these organizations in his respective district.

3. The Committee Chairman, who is thereby Chairman of the Executive Committee of the Montana Women's Field Army, has worked with that organization in planning and advising for education of the public about cancer—in short, that early cancer is curable. He must also approve budgets and payments of all bills of this organization, which spent over $1500 in the past year's campaign.

4. It sent material for talks on cancer to all doctors requesting such material.

5. It planned to make a survey of the deaths from cancer in Montana last year, but complete records of patient's name, doctor's name, and address will not be available for 1938. However, they are being filed for 1939, and if the association thinks it advisable, the plan will be carried out next year.

6. In 1910 there were 157 deaths from cancer in Montana, which number had increased to 583 in 1937, and decreased to 548 last year. We hope that by continued education of the public, this decrease in cancer mortality will continue.

R. F. PETERSON, M.D.

REPORT OF COMMITTEE ON ORTHOPEDICS

Our State Legislature in 1937 created a State Department of Public Welfare and established within that Department, a Division for Service to Crippled Children. Previous to that date and since 1921, services, such as the State was able to offer through inadequate funds, were under the direction of the Montana Orthopedic Commission.

The Division of Crippled Children came under the State Department of Public Welfare on July 1st, 1937. The Division of Crippled Children maintains its central offices in the Public Welfare Building in Helena, Montana, and functions with a full-time staff of three technically trained orthopedic nurses, Miss Freda E. Miller, Director of the Department, Miss Mabel F. Johnson, and Miss Estelle H. Kezer. Five orthopedic surgeons, L. W. Allard, M.D., Billings, Montana; J. K. Coleman, M.D., Butte, Montana; E. M. Porter, M.D., Great Falls, Montana; E. S. Porter, M.D., Lewistown, Montana, and J. R. Vasko, M.D., Great Falls, Montana, serve on a part-time basis. The orthopedic surgeons are remunerated for their work according to an established fee schedule. They receive a per diem and expenses while conducting diagnostic clinics at several population centers throughout the State. Care for crippled children in each of these districts is assigned to an orthopedic surgeon.

The surgeons were appointed on the recommendations of the State Medical Society. Three of these surgeons have been certified to by the American Board of Orthopedic Surgery. The other two will qualify by training and experience. They, because of established general practices, can not economically limit themselves to orthopedic work. However, their long years of unselfish service entitles them to retain their position with the Crippled Children Division.

The following hospitals: The Columbus Hospital, Great Falls, Montana; The Deaconess Hospital, Great Falls, Montana; The Murray Hospital, Butte, Montana; Shodair Hospital, Helena, Montana; St. Joseph's Hospital, Lewistown, Montana, and St. Vincent's Hospital, have been approved to take care of State cases. Any hospital, before being approved, must show that it is adequately equipped and properly personneled for this particular type of work.

Under the provisions of the Crippled Children Division of the Welfare Department, any resident of the State under 21 years of age, who has a remediable orthopedic defect the care of which they can not themselves finance, is qualified to receive financial help in the treatment of the defect.

The Division extends its assistance to cover the surgeon's fee according to the fee schedule, hospitalization, braces, appliances, artificial limbs, etc. The Division also maintains a follow-up service, this service practically paying for itself by the saving in hospital care through earlier dismissal. The same service also seeks out through the family physician and public health nurses cases that should be examined and advised because of neglected defects.

To simplify the problem throughout the State, prospective cases and those that have been discharged at an earlier date are brought to the diagnostic centers, mentioned earlier in this report. Between March 1st, 1937, and March 1st, 1938, 729 children were examined at these clinics; 220 of these were hospitalized for a total number of 10,292 days. During this same period 982 home calls were made by the public health nurses and 65 cases were referred to the Bureau of Vocational Rehabilitation.

Between July 1st, 1937, and March 1st, 1938, $46,347.18 was expended on the care of the crippled children. This cost was divided equally between State and Federal funds. It is interesting to note that the State office personnel cost was $4,280.00; the field personnel was $840.00, to which should be added travel and subsistence costs of $1,153.68 for the office personnel and $571.95 for field personnel. $23,780.71 was paid for hospital care, the surgeons receiving $10,339.42 for their fees and services during this period, to which should be added $2,825.00 for convalescent care and $139.40 for travel. Other expenditures, such as stationery, office supplies, telephone and telegraph, appliances, etc., make up the balance of the total expenditure. These figures were taken from page 92 of the March 1st, 1938, report to the Governor.

We have had to use these figures as an example of the expenditures of the Crippled Children Division because of the fact that the 1939 report will not be available until early in July. The 1939 report will probably be in like proportion.

It is to be noted that the administrative costs for the past two years amount to only 8.9 per cent, the balance of the appropriated funds being spent for services.

The 1937 legislature appropriated $37,000.00 for services to crippled children while the 1939 legislature appropriated $40,000.00 per annum, this sum being matched to federal funds.

The average cost per case treated in the hospital during 1937 was $248.85. As the fees and per diem costs have not been materially altered, approximately the same cost per case likely will prevail now.

The Division estimates Montana has approximately 3,200 cases under 21 years of age, these cases being orthopedic. Your committee would estimate this figure to be a little low. Nearly 2,000 of these cases have been examined and diagnosed.

Numerous problems have naturally presented themselves throughout the years. These problems usually are satisfactorily solved at conferences with the Department officials. Several of these problems, however, demand more adequate solution.

On April 27th, the Secretary of the State Medical Society sent out a questionnaire to the members of your committee, presenting several queries which your committee now enumerates with its recommendations:

1. Do you believe an internist or pediatrician should be available for the care of orthopedic patients while in the orthopedic center?

Answer: The direct answer to this question is "yes"; however, the orthopedic surgeon should be in a position to handle most of the incidental medical and surgical problems that accompany the case under his care. This has been done in the past and will be continued into the future. Extraordinary cases do present themselves when it is advisable to call in a specialist from some other field. This also has been done without added cost to the crippled children fund, but there does remain the few isolated cases where the consultant performs a very major service and should be compensated in some way for this help. Some provision should be made by the State Department to take care of this problem within definite limitations.

2. Do you believe that this consultant should be selected by the orthopedic surgeon—if not, how should he be selected?

Answer: The orthopedic surgeon should call in the consultant he feels most confident to assist him with the diagnosis or care of the case.

3. How should the consultant be remunerated, by the case, or by the visit?

Answer: This is a difficult question to answer unless the State Department can provide an acceptable fee schedule for consultation that would cover most of the consultation problems that arise. Otherwise, there will need to be a combination of case and visit remuneration according to the problem.

4. In cases requiring the attention of the physician following the return home of a patient, would it be practicable to instruct the family physician as to the type of service required and for him to present his bill for services to the orthopedic surgeon who would endorse and present it to the orthopedic office for payment?

Answer: We firmly believe that the family physician should be compensated for follow-up treatment in the case of an

orthopedic case who is sent home before convalescence is completed. This would not add materially to the cost of the case as it might save by early discharge from the hospital sufficient to make up for the extra cost. The family physician should not be required to spend his time, talent, or material where follow-up work remains under the direction of the orthopedic surgeon.

5. In the event of the development of a non-orthopedic condition in the patient while under orthopedic care, should the family physician be compensated for his services by the Welfare Board?

Answer: Non-orthopedic conditions developing while under treatment for orthopedic problems should be compensated for by the State Department provided the complication is related to the orthopedic problem, is connected with or influenced by it. Disassociated illnesses should be handled as they would have been handled if the cases had not once been under orthopedic care.

6. It has been implied that a Medical Advisory Committee to the Orthopedic Division of the Welfare Board would be welcomed. Do you believe this committee should be composed of only physicians, not designated as orthopedic surgeons?

Answer: This is an important question and may have far-reaching effects. Your committee feels that there should be a committee of at least three, one of whom should be an orthopedic surgeon who can advise with the Welfare Department as a representative of the Montana State Medical Association. Your committee further feels that any and all funds appropriated for the care of the crippled children should be spent precisely for that purpose. Any attempt to divert these funds by broadening the field to include care outside of orthopedic conditions should be censured. Once an exception is made, there could be no limit to which the dissipation of pacifically appropriated funds could be carried.

LOUIS W. ALLARD, M.D.
JOHN R. VASKO, M.D.
E. M. PORTER, M.D.
E. S. PORTER, M.D.
J. K. COLEMAN, M.D.

REPORT OF ECONOMICS COMMITTEE

To the President and House of Delegates of the Medical Association of Montana: On April 2, 1939, a meeting was called of the Economics Committee at Helena, Montana. A discussion ensued as to the Medical and Hospital situation, and its relation to public welfare. We asked our secretary, Dr. T. L. Hawkins, to contact Mr. A. G. Stacil, Manager of the Nicollet Clinic at Minneapolis, and President of the Minnesota Hospital Service Association of the Twin Cities, and invite him to Montana for the purpose of discussing and explaining "Group Hospitalization" to the Economics Committee and the Montana Hospital Association.

Dr. T. L. Hawkins made such arrangements and on May 10, 1939, Mr. A. G. Stacil spent some three hours explaining and discussing "Group Hospitalization" to the Economics Committee. In the afternoon of May 10, 1939, Mr. A. G. Stacil spoke to the members of the Montana Hospital Association. Following our meeting with Mr. A. G. Stacil, your Economics Committee then advised and requested the officers of the Montana State Medical Association to secure the services, and invite Mr. A. G. Stacil to attend the annual meeting of the Montana State Medical Association at Butte, on the 28th, 29th, and 30th of June, 1939, for the purpose of speaking to the members of the profession and the delegates of the Association.

Following our meeting in Helena the subject of Articles of Incorporation and By-Laws was taken up, and tentative copies of each have been prepared. A joint meeting of the Economics Committee, and a committee from the Montana Hospital Association was called and has been in session for the last three days. We have corrected and modified Articles of Incorporation and By-Laws which shall become a part of this report and resolution.

. . . . .

Whereas: A combined meeting of the Montana Hospital Association and the Economics Committee of the State Medical Association have formulated certain plans and proposed "Articles of Incorporation" of the proposed "Montana Hospital Service Association";

Whereas: *It is the opinion* of the Medical Economics Committee that said proposed "Hospital Service Association" plan *is* for the good of public welfare of the State of Montana, and for the benefit of the people of the State of Montana needing hospitalization;

Now, therefore, be it resolved, that the House of Delegates approve said proposed plan, and that the Montana State Medical Association lend to said proposed plan their active support and aid.

J. C. SHIELDS, M.D., Chairman.
J. P. RITCHEY, M.D.
R. B. DURNIN, M.D.
FRED F. ATTIX, M.D.
J. H. GARBERSON, M.D.

. . . . .

The Montana Hospital Association have approved "Group Hospitalization" and desire to incorporate "A Hospital Service Association." It is the unanimous opinion of your Economics Committee that such a plan of "Group Hospitalization" is feasible in this state. It is also our opinion that "Group Hospitalization" will do much to improve the public welfare, and be of great benefit and service to our commonwealth.

J. C. SHIELDS, M.D., Chairman.
J. P. RITCHEY, M.D.
R. B. DURNIN, M.D.
FRED F. ATTIX, M.D.
J. H. GARBERSON, M.D.

REPORT OF HISTORICAL COMMITTEE

During the past we have made considerable progress in the work. This has been under the direction of Attorney Lew L. Callaway who has a thorough grasp of the historical data in the State of Montana and he has been re-writing much of the material. The material is entirely gathered and in good shape with the exception of the history covering the State Board of Health, the Rocky Mountain Spotted Fever work, the State Asylum at Warm Springs and the State Tuberculosis Sanitarium at Galen. This material has been promised repeatedly but it is very difficult to get the heads of these institutions to finish the work. However, I believe that results will be forthcoming during the coming year.

There is considerable re-writing and proof-reading from a medical standpoint of the work but I believe that this can be completed during the coming year. This Committee feels that an appropriation of $500.00 should be made for this work, as considerable stenographic work is required. There has been no appropriation during the past year covering this work.

We therefore recommend that this work be continued and that an appropriation of $500.00 be made to cover the expense.

THOS. F. WALKER, M.D.

MONTANA STATE MEDICAL ASSOCIATION DISTRICT SOCIETY ROSTER--1939

BIG HORN MEDICAL SOCIETY

Benjamin, M. B.
Baker, Geo. A.
Haverfield, L. E.
Labbitt, L. H.
Schubert, J. W.

CASCADE COUNTY MEDICAL SOCIETY

Allred, Ivan A.
Anderson, Evon L.
Andrews, F. L.
Bateman, H. W.
Blankenhorn, C. E.
Bresee, C. J.
Cooper, D. J.
Coulter, C. F.
Crary, L. S.
Davis, R. C.
Durnin, R. B.
Gibson, H. V.
Gleason, A. L.
Greaves, J. P.
Hitchcock, E. D.
Holzberger, R. J.
Howard, L. L.
Irwin, J. H.
Johnson, A. C.
Kaulback, J. J.
Keenan, F. E.
Larson, E. M.
Little, C. F.
Logan, P. E.
Lord, B. E.
Macaulay, A. M.
MacBurney, L. R.
McGregor, H. J.
MacGregor, J. C.
McGregor, R. J.
Mayland, L. L.
McPhail, F. L.
Nagel, C. E.
Peterson, C. H.
Place, B. A.
Porter, E. M.
Richardson, R. B.
Russell, Rosannah
Schemm, F. R.
Setzer, G. W.
Silvernale, F. P.
Strain, Earle
Templeton, C. V.
Vasko, J. R.
Walker, Dora
Walker, T. F.
Waniata, F. K.
Weisgerber, A. L.
Williams, W. T.

FERGUS COUNTY MEDICAL SOCIETY

Alexander, J. L.
Attix, Fred F.
Deal, A. W.
Freed, Hazel
Gans, E. M.
Gans, E. W.
Gans, P. J.
Herring, J. H.
Johnson, R. G.
Piedalue, J.
Porter, E. S.
Soltero, J. R.
Wallin, C. C.
Welden, E. A.
Wilder, C. W.
Willess, H. F.

FLATHEAD COUNTY MEDICAL SOCIETY

Borkon, M.
Bottorf, Morris W.
Bottorf, Phoebe
Brassett, Albert J.
Brown, James W.
Cairns, J. M.
Clark, C. A.
Cockrell, E. P.
Conway, W. Q.
Dodge, A. A.
Griffis, L. G.
Hodgkin, W. E.
Holcomb, M. D.
Huggins, N.
Kell, W. L.
Lamb, J. A.
Martin, C. J.
Moore, T. B., Jr.
Munro, A. T.
Noble, P. C.
Richards, J. L.
Ross, F. B.
Taylor, W. W.
Towne, R. L.
Wright, G. B.

GALLATIN COUNTY MEDICAL SOCIETY

Bole, W. S.
Brewer, A. D.
Eneboe, P. L.
Grigg, E. R.
Heetdirks, B. J.
Kearns, E. J.
Maillet, L. L.
Phillips, J. H.
Sabo, F. I.
Scherer, R. G.
Seerley, C. C.
Seitz, R. E.
Sigler, R. R.
Smith, C. S.
Stanchfield, H.
Whitehead, C. E.

HILL COUNTY MEDICAL SOCIETY

Almas, D. J.
Aubin, F. W.
Briggs, F. W.
Delaney, J. R.
Doles, E. A.
Forester, W. L.
Hamilton, W. F.
Hoon, A. S.
Houtz, C. S.
Jestrab, G. A.
Lacey, W. A.
MacKenzie, D. S.
MacKenzie, D. S., Jr.
McCannel, W. A.
Rogers, W. B.
Sussex, L. T.

LEWIS & CLARK COUNTY MEDICAL SOCIETY

Barbour, Geo. H.
Bayles, R. G.
Berg, D. T.
Cashmore, W. F.
Cooney, S. A.
Copenhaver, W. M.
†Fligman, L. H.
Flinn, J. M.
Gallivan, E. L.
Hall, L. F.
Hawkins, T. L.
Hershey, Edythe
Jump, C. F.
Kilbourne, B. K.
Klein, O. G.
Lindstrom, E. H.
McCabe, James
Morris, R. W.
Shearer, B. C.
Thompson, J. G.
Tyler, K. A.

MADISON COUNTY MEDICAL SOCIETY

Clancy, D. F.
Dyer, R. H.
Farnsworth, F. B.

MOUNT POWELL MEDICAL SOCIETY

Anderson, G. A.
Beasley, Warren A.
Bolton, Leroy
Brogan, R. E.
Crowley, L. G.
Dunlap, L. G.
Dunn, J. C.
Getty, R. W.
Holmes, G. V.
Kargacin, T. J.
Knight, A. C.
Lieurance, E.
Long, W. E.
Malee, J. J.
Malloy, F. J.
Noonan, J. N.
O'Rourke, L. J.
Pampel, B. L.
Snodgrass, M. R.
Terrill, F. I.
Unmack, F. L.
Veldhuis, J. G.
Willets, A. J.

MUSSELLSHELL COUNTY MEDICAL SOCIETY

Bennett, A. A.
Crouse, S. A.
Fouts, E. R.
Lewis, G. A.
Person, E. C.
Vornhott, Mark

NORTH CENTRAL MONTANA MEDICAL SOCIETY

Dale, E. E.
DuBois, W. L.
Leist, L. J.
Meadows, W. A.
Neraal, P. O.
Olsen, N. A.
Paterson, W. F.
Powell, C. D.
Power, H. W.
Robinson, W. C.
Schraeder, H. F.

NORTHEASTERN MONTANA MEDICAL SOCIETY

Benson, O. G.
Cloud, H. B.
Cockrell, T. L.
Knapp, R. D.
Knierim, F. M.
Kreft, A. J.
Krogstad, L. T.
Larson, C. B.
Lawson, C. W.
Munch, C. J.
O'Donnell, J. E.
Smith, A. N.
Spatz, J. M.
Storkan, J. C.

PARK COUNTY MEDICAL SOCIETY

Baskett, L. W.
Claiborn, D. R.
Cogswell, W. F.
Greene, P. L.
Harris, W. E.
Leard, S. E.
Pearson, J. A.
Spittler, R. O.
Townsend, G. A.
Walker, R. E.
Windsor, G. A.

SILVERBOW COUNTY MEDICAL SOCIETY

Atkins, D. A.
Canty, C. R.
Carmichael, G. A.
Casebeer, H. L.
Coleman, J. K.
Emery, C. E.
Floyd, J. S.
Frisbee, J. B.
Garvey, J. E.
Gillespie, D. L.
Gold, M. A.
Graff, Sarah
Gregg, H. W.
Hale, D. E.
Hill, R. J.
Horst, C. H.
James, H. H.
Joesting, H. C.
Kane, J. J.
Kane, P. E.
Kane, R. C.
Karsted, A.

Kroeze, R.
Lhota, J. F.
MacPherson, G. T.
Malee, F. H.
McMahon, E. S.
Monahan, R. C.
Mondloch, J. L.
Morse, A. W.
O'Keefe, N. J.
Packard, L. R.
Pemberton, C. W.
Peterson, R. F.
Poindexter, F. M.
Routledge, G. L.
Saam, T. W.
Schwartz, H.
Schwartz, S. E.
Shanley, T. J. B.
Shields, J. C.
Sievers, A. R.
Sievers, J. R. E.
Simons, Harold
Smetters, McCormick
Smith, L. W.
Spurck, P. T.
Steinberg, S. S.
Stephan, W. H.
Thorkelson, J.
Ungherini, V. O.
Wilking, S. V.
Williams, F. J.

SOUTHEASTERN MONTANA MEDICAL SOCIETY

Beagle, J. S.
Benson, R. D.
Bridenstine, I. J.
Blakemore, W. H.
Cotton, Wendell
Damm, W. P.
Danskin, M. G.
Denman, H.
†Evert, J. A.
Farrand, B. C.
Garberson, J. H.
Halleck, P. P.
Harper, R. D.
Haywood, G. T.
Hogeboom, C. T.
Howard, E. M.
Huene, H. J.
Hunt, J. H.
Lemon, R. G.
Lindeberg, S. B.
Lund, Carroll
Morrill, R. A.
Neville, J. V.
Olson, S. A.
Randall, R. R.
Rowen, E. H.
Sandy, B. B.
Shillington, M. A.
Tarbox, B. R.
Thompson, J. R.
Varco, A. R.
Wesson, H.
Winter, M. D.

WESTERN MONTANA MEDICAL SOCIETY

Alderson, L. R.
Bourdeau, C. L.
Bourdeau, E. J.
Brewer, L. W.
Browning, H. D.
Crecelius, H. A.
Doyle, W. J.
Flynn, J. J.
Foss, A. R.
Fredrickson, C. H.
French, E. G.
George, E. K.
Golley, P. M.
Gordon, D. A.
Graybeal, J. M.
Haas, A. T.
Hall, H. J.
Hayward, Herbert
Hiemstra, A. W.
Hesdorffer, M. B.
Holmes, J. T.
Honeycutt, C. F.
Jennings, G. M.
Kintner, A. R.
Lowe, Fred H.
Marshall, J. F. S.
Marshall, W. J.
Martin, L. P.
McGill, Caroline
McPhail, W. N.
Murphy, E. S.
Nelson, J. M.
Ohlmacher, J. P.
Pease, F. D.
Randall, J. G.
Rennick, P. S.
Rew, A. W.
Ritchey, J. P.
Rodes, C. B.
Sale, G. G.
Shephard, H. C.
Smith, H. C.
Tefft, C. C.
Thornton, C. R.
Thornton, W. T.
Trenouth, S. M.
Turman, G. F.

YELLOWSTONE VALLEY MEDICAL SOCIETY

Adams, E. M.
Allard, L. W.
Beltzer, Chas. E.
Blackstone, A. V.
Bridenbaugh, J. H.
Brunkow, B. H.
Caraway, H. T.
Chapple, R. R.
Clark, A. E.
Culbertson, H. H.
Drew, H. O.
Dunkle, Frank
Farr, E. M.
Ferree, V. D.
Gordon, Wayne
Graham, J. H.
Griffin, P. E.
Hagmann, E. A.
Hall, E. C.
Hammerel, A. L.
Hanley, R. J.
Harmon, D. S.
Hodges, D. E.
Hurd, F. D.
Hynes, J. E.
Kronmiller, L. H.
Leeper, D. D.
McIntyre, H. E.
Morledge, Roy V.
Morrison, W. R.
Movius, A. J.
Nelson, C. H.
Powers, J. C.
Rathman, O. C.
Rich, E. L.
Richards, W. G.
Russell, G. M.
Russell, L. G.
Smith, W. P.
Souders, S. M.
Stevens, L. S.
Stripp, A. E.
Stubblebine, J. G.
Vye, T. R.
Weedman, W. E.
Wernham, J. I.

†*Deceased.*

ALPHABETICAL ROSTER
Montana State Medical Association--1939

Adams, E. M. — Red Lodge
Alderson, L. R. — Missoula
*Alexander, J. L. — Winnett
Allard, L. W. — Billings
Allred, Ivan A. — Great Falls
Almas, D. J. — Havre
Anderson, Evon L. — Fort Benton
Anderson, G. A. — Deer Lodge
Andrews, F. L. — Great Falls
Atkins, D. A. — Butte
Attix, Fred F. — Lewistown
Aubin, Francis W. — Havre
Baker, Geo. A. — Hardin
Barbour, Geo. H. — Helena
Baskett, L. W. — Big Timber
Bateman, H. W. — Choteau
Bayles, R. G. — Townsend
Beagle, J. S. — Sidney
Beasley, Warren A. — Galen
Beltzer, Chas. E. — Washoe
Benjamin, M. B. — Crow Agency
Bennett, A. A. — Roundup
Benson, O. G. — Plentywood
Benson, R. D. — Sidney
Berg, David T. — Helena
Blackstone, A. V. — Columbus
Blakemore, W. H. — Baker
Blankenhorn, C. E. — Great Falls
Bole, W. S. — Bozeman
Bolton, Leroy — Deer Lodge
Borkon, M. — Whitefish
Bottorf, Morris W. — Kalispell
Bottorf, Phoebe — Kalispell
Bourdeau, C. L. — Missoula
Bourdeau, E. J. — Missoula
Brassett, Albert J. — Kalispell
Bresee, C. J. — Great Falls
Brewer, A. D. — Bozeman
Brewer, L. W. — Missoula
Bridenbaugh, J. H. — Billings
Bridenstine, I. J. — Terry
Briggs, F. W. — Havre
Brogan, R. E. — Deer Lodge
Brown, James W. — Whitefish
Browning, H. D. — Hamilton
Brunkow, Benj. H. — Billings
Cairns, J. M. — Libby
Canty, Chas. R. — Butte
Caraway, H. T. — Billings
Carmichael, Glen A. — Butte
Casebeer, H. L. — Butte
Cashmore, W. F. — Helena
Chapple, R. R. — Billings
Claiborn, D. R. — Big Timber
Clancy, D. F. — Ennis
Clark, A. E. — Billings
Clark, C. A. — Eureka
Cloud, H. B. — Wolf Point
Cockrell, E. P. — Kalispell
Cockrell, T. L. — Hinsdale
Cogswell, W. F. — Helena
Coleman, J. K. — Butte
Conway, W. Q. — Kalispell
Cooney, S. A. — Helena
Cooper, Denton J. — Big Sandy
Copenhaver, W. M. — Helena

Cotton, Wendell — Circle
*Coulter, Chas. F. — Great Falls
Crary, L. S. — Fairfield
Crecelius, H. A. — Plains
Crouse, S. A. — Roundup
Crowley, L. G. — Warm Springs
Culbertson, H. H. — Billings
Dale, E. E. — Cut Bank
Damm, W. P. — Terry
Danskin, M. G. — Glendive
Davis, R. C. — Great Falls
*Deal, A. W. — Lewistown
Delaney, J. R. — Chester
Denman, H. — Baker
Dodge, A. A. — Kalispell
Doles, E. A. — Havre
Doyle, W. J. — Superior
Drew, H. O. — Billings
DuBois, W. L. — Conrad
Dunkle, Frank — Billings
Dunlap, L. G. — Anaconda
Dunn, J. C. — Warm Springs
Durnin, R. B. — Great Falls
Dyer, R. H. — Sheridan
Emery, C. E. — Butte
Eneboe, P. L. — Bozeman
†Evert, J. A. — Glendive
Farnsworth, F. B. — Virginia City
Farr, E. M. — Billings
Farrand, B. C. — Jordan
Ferree, V. D. — Bridger
†Fligman, L. H. — Helena
Flinn, J. M. — Helena
Floyd, J. S. — Butte
Flynn, J. J. — Missoula
Forester, W. L. — Havre
Foss, A. R. — Missoula
Fouts, E. R. — Ryegate
Fredrickson, Clyde H. — Missoula
Freed, Hazel — Stanford
French, E. G. — Ronan
Frisbee, J. B. — Butte
Gallivan, E. L. — Helena
Gans, E. M. — Harlowton
Gans, E. W. — Harlowton
Gans, Paul J. — Lewistown
Garberson, J. H. — Miles City
Garvey, J. E. — Butte
George, E. K. — Missoula
Getty, R. W. — Galen
Gibson, H. V. — Great Falls
Gillespie, D. L. — Butte
Gleason, A. L. — Cascade
Gold, M. A. — Butte
Golley, P. M. — Missoula
Gordon, Donald A. — Hamilton
Gordon, Wayne — Billings
Graff, Sarah F. — Butte
Graham, J. H. — Billings
Graybeal, J. M. — Missoula
Greaves, J. P. — Great Falls
Greene, P. L. — Livingston
Gregg, Harold — Butte
Griffin, P. E. — Billings
Griffis, L. G. — Kalispell
Grigg, E. Roy — Bozeman
Haas, A. T. — Missoula
Hagmann, E. A. — Billings
Hale, D. E. — Butte
Hall, E. C. — Laurel
Hall, H. J. — Missoula
Hall, L. F. — Helena
Halleck, P. P. — Broadus
Hamilton, W. F. — Havre
Hammerel, A. L. — Billings
Hanley, R. J. — Billings
Harmon, D. S. — Worland, Wyo.
Harper, R. D. — Sidney
Harris, W. C. — Livingston
Haverfield, L. E. — Hardin
Hawkins, Thos. L. — Helena
Hayward, Herbert — Hamilton
Haywood, G. T. — Forsyth
Heetderks, B. J. — Bozeman
Herring, J. H. — Lewistown
Hershey, Edythe — Helena
Hesdorffer, M. B. — Missoula
Hiemstra, A. W. — Missoula
Hill, R. J. — Whitefish
Hitchcock, E. D. — Great Falls
Hodges, D. Ernest — Billings
Hodgkin, W. E. — Kalispell
Hogeboom, C. T. — Baker
Holcomb, Mark D. — Whitefish
Holmes, G. V. — Warm Springs
Holmes, J. T. — Missoula
Holzberger, R. J. — Great Falls
Honeycutt, C. F. — Missoula
Hoon, A. S. — Chinook
Horst, C. H. — Butte
Houtz, Chas. S. — Havre
Howard, Elna M. — Miles City
Howard, L. L. — Great Falls
Huene, H. J. — Forsyth
Huggins, N. — Kalispell
Hunt, J. H. — Glendive
Hurd, F. D. — Billings
Hynes, John E. — Billings
Irwin, J. H. — Great Falls
James, H. H. — Butte
Jennings, G. M. — Missoula
Jestrab, G. A. — Havre
Joesting, H. C. — Butte
Johnson, A. C. — Great Falls
Johnson, R. G. — Harlowton
Jump, C. F. — Helena
Kane, Jos. J. — Butte
Kane, P. E. — Butte
Kane, R. C. — Butte
Kargacin, Tom J. — Anaconda
Karsted, A. — Butte
Kaulback, J. J. — Fort Benton
Kearns, E. J. — Bozeman
Keenan, F. E. — Great Falls
Kell, W. L. — Columbia Falls
Kilbourne, B. K. — Helena
Kintner, A. R. — Missoula
Klein, Otto G. — Helena
Knapp, R. D. — Wolf Point
Knierim, F. M. — Glasgow
Knight, A. C. — Philipsburg
Kreft, A. J. — Fort Peck
Kroeze, R. — Butte
Krogstad, L. T. — Wolf Point
Kronmiller, L. H. — Billings
Labbitt, L. H. — Hardin
Lacey, W. A. — Havre
Lamb, J. A. — Kalispell
Larson, C. B. — Glasgow
Larson, E. M. — Great Falls
Lawson, Chester W. — Glasgow
Leard, S. E. — Livingston
Leeper, D. D. — Laurel
Leist, L. J. — Cut Bank
Lemon, R. G. — Glendive
Lewis, G. A. — Roundup
Lhotka, J. F. — Butte
Lieurance, E. — Warm Springs
Lindeberg, Sadie B. — Miles City
Lindstrom, E. H. — Helena
Little, Chas. F. — Great Falls
Logan, P. E. — Great Falls
Long, W. E. — Anaconda
Lord, B. E. — Great Falls
Lowe, Fred H. — Missoula
Lund, Carroll — Fairview
Macaulay, A. M. — Great Falls
MacBurney, LeRoy — Great Falls
MacGregor, H. J. — Great Falls
MacGregor, J. C. — Great Falls
MacGregor, R. J. — Great Falls
MacKenzie, D. S., Jr. — Havre
MacKenzie, D. S. — Havre
MacPherson, G. T. — Butte
Maillet, L. L. — Three Forks
Malee, F. H. — Butte
Malee, J. J. — Anaconda
Malloy, F. J. — Anaconda
Marshall, J. F. S. — Missoula
Marshall, W. J. — Missoula
Martin, C. J. — Libby
Martin, L. P. — Missoula
Mayland, L. L. — Great Falls
McCabe, James — Helena
McCannel, W. A. — Harlem
McGill, Caroline — Butte
McIntyre, H. E. — Billings
McMahon, E. S. — Butte
McPhail, F. L. — Great Falls
McPhail, W. N. — Missoula
Meadows, W. A. — Sunburst
Monahan, R. C. — Butte
Mondloch, J. L. — Butte
Moore, T. B., Jr. — Kalispell
Morledge, Roy V. — Billings
Morrill, R. A. — Sidney
Morris, R. Wynne — Helena
Morrison, W. R. — Billings
Morse, A. W. — Butte
Movius, A. J. — Billings
Munch, C. J. — Culbertson
Munro, A. T. — Kalispell
Murphy, E. S. — Missoula
Nagel, C. E. — Great Falls
Nelson, C. H. — Billings
Nelson, J. M. — Stevensville
Neraal, P. O. — Cut Bank
Neville, J. Vernon — Forsyth
Noble, P. C. — Polson
Noonan, J. N. — Anaconda
Ohlmacher, J. P. — Missoula
O'Donnell, J. E. — Fort Peck
O'Keefe, N. J. — Butte
Olsen, N. A. — Cut Bank
Olson, S. A. — Glendive
O'Rourke, Leo J. — Anaconda
Packard, L. R. — Whitehall
Pampel, B. L. — Warm Springs
Paterson, W. F. — Conrad
Pearson, J. A. — Livingston
Pease, F. D. — Missoula
Pemberton, C. W. — Butte
Person, E. C. — Roundup
Peterson, C. H. — Great Falls
Peterson, R. F. — Butte
Phillips, J. H. — Bozeman
Piedalue, Jos. — Lewistown
Place, B. A. — Great Falls
Poindexter, F. M. — Dillon
Porter, E. M. — Great Falls
Porter, E. S. — Lewistown
Powell, C. D. — Valier
Power, H. W. — Conrad
Powers, J. C. — Billings
Randall, J. G. — Missoula
Randall, R. R. — Miles City
Rathman, O. C. — Billings
Rennick, P. S. — Stevensville
Rew, A. W. — Thompson Falls
Rich, E. L. — Billings
Richards, J. L. — Polson

Richards, W. G. ..... Billings
Richardson, R. B. ..... Great Falls
Ritchey, J. P. ..... Missoula
Robinson, W. C. ..... Shelby
Rodes, C. B. ..... Butte
Rogers, W. B. ..... Havre
Ross, F. B. ..... Kalispell
Routledge, Geo. L. ..... Dillon
Rowen, E. H. ..... Miles City
Russell, G. M. ..... Billings
Russell, Leland G. ..... Billings
Russell, Rosannah ..... Simms
Saam, T. W. ..... Butte
Sabo, F. I. ..... Bozeman
Sale, G. G. ..... Missoula
Sandy, B. B. ..... Ekalaka
Schemm, F. R. ..... Great Falls
Scherer, R. G. ..... Bozeman
Schraeder, H. F. ..... Browning
Schubert, J. W. ..... Hardin
Schwartz, Harold ..... Butte
Schwartz, S. E. ..... Butte
Seerley, C. C. ..... Bozeman
Seitz, R. E. ..... Bozeman
Setzer, G. W. ..... Malta
Shanley, T. J. B. ..... Butte
Shearer, Beryl C. ..... Helena
Shephard, H. C. ..... Missoula
Shields, J. C. ..... Butte
Shillington, M. A. ..... Glendive
Sievers, A. R. ..... Butte
Sievers, J. R. E. ..... Butte
Sigler, R. R. ..... Bozeman
Silvernale, F. P. ..... Great Falls
Simons, Harold ..... Butte
Smetters, McCormick ..... Butte
Smith, A. N. ..... Glasgow
Smith, C. S. ..... Bozeman
Smith, H. C. ..... Missoula
Smith, L. W. ..... Butte
Smith, W. P. ..... Columbus
Snodgrass, M. R. ..... Anaconda
Soltero, J. R. ..... Lewistown
Souders, S. M. ..... Red Lodge
Spatz, J. M. ..... Glasgow
Spittler, Russell O. ..... Livingston
Spurck, P. T. ..... Butte
Stanchfield, H. ..... Manhattan
Steinberg, S. S. ..... Butte
Stephan, W. H. ..... Dillon
Stevens, L. S. ..... Billings
Storkan, Jos. C. ..... Plentywood
Strain, Earle ..... Great Falls
Stripp, A. E. ..... Billings
Stubblebine, Jas. G. ..... Big Timber
Sussex, Lloyd T. ..... Havre
Tarbox, Byron R. ..... Baker
Taylor, W. W. ..... Whitefish
Tefft, C. C. ..... Hamilton
Templeton, C. V. ..... Great Falls
Terrill, F. I. ..... Galen
Thompson, John G. ..... Helena
Thompson, James R. ..... Miles City
Thorkelson, J. ..... Butte
Thornton, C. R. ..... Missoula
Thornton, W. T. ..... Missoula
Towne, R. L. ..... Kalispell
Townsend, G. A. ..... Livingston
Trenouth, S. M. ..... Missoula
Turman, G. F. ..... Missoula
Tyler, K. A. ..... Boulder
Ungherini, V. O. ..... Butte
Unmack, Frank L. ..... Deer Lodge
Varco, A. R. ..... Miles City
Vasko, John R. ..... Great Falls
Veldhuis, J. G. ..... Warm Springs
Vornhott, Mark ..... Roundup
Vye, T. R. ..... Laurel
Walker, Dora V. H. ..... Great Falls
Walker, R. E. ..... Livingston
Walker, Thos. F. ..... Great Falls
Wallin, C. C. ..... Lewistown
Waniata, F. K. ..... Great Falls
Weedman, W. E. ..... Billings
Weisgerber, A. L. ..... Great Falls
Welden, E. A. ..... Lewistown
Wernham, Jas. I. ..... Billings
Wesson, H. ..... Miles City
Whitehead, C. E. ..... Bozeman
Wilder, Curtis W. ..... Lewistown
Wilking, S. V. ..... Butte
Willess, H. F. ..... Lewistown
Williams, F. J. ..... Butte
Williams, W. T. ..... Malta
Willits, A. J. ..... Anaconda
Windsor, G. A. ..... Livingston
Winter, M. D. ..... Miles City
Wright, G. B. ..... Kalispell

*Life Membership.
†Deceased.

Report of Committee on Organization and Administration, American Student Health Association*

Helen B. Pryor, M.D.†
Palo Alto, California

Round Table No. I. Representatives from all state-supported and large endowed co-educational colleges and universities. *Sub-chairman*, Dr. Ruby Cunningham, University of California.

Round Table No. II. Representatives from all small endowed co-educational colleges and universities. *Sub-chairman*, Dr. George T. Blydenburgh, Ohio Wesleyan University.

Round Table No. III. Representatives from Women's Colleges. *Sub-chairman*, Dr. Grace Hiller, Goucher College.

Round Table No. IV. Representatives from Men's Colleges. *Sub-chairman*, Dr. J. P. Ritenour, Pennsylvania State College.

Round Table No. V. Representatives from municipal colleges and universities having almost exclusive day school enrolments. *Sub-chairman*, Dr. F. A. Woll, College of the City of New York.

Round Table No. VI. Representatives from Teachers Colleges. *Sub-chairman*, Dr. Glenadine Snow, Michigan State Normal College.

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On Friday, December 30, from 10:30 a. m. to 12 m., Drs. Cunningham, Blydenburgh, Hiller, Ritenour, Woll and Snow brought in summarized reports of the previous day's Round Tables, aided by discussions from the floor.

Dr. Cunningham in reporting the discussion on "Standardization of Items in the Health Examination of Entering Students" recommended:

1. The use of the method for visual appraisal prepared by the Committee on Eye Health.

2. The use of the audiometer to measure hearing acuity.

3. The use of certain refinements of the old height-weight tables in evaluating nutrition. She referred to Dr. Diehl's figures from the various colleges and certain insurance tables. The superiority of the Width-weight Tables was pointed out and also the fact that without taking body build into consideration an injustice is done in appraising nutrition for approximately one-third of the student body.

4. The use of the tuberculin skin test followed up by fluoroscopy and chest plates on positive reactors. In spite of the fact that the accuracy of the tuberculin skin test has been challenged, Dr. Lee H. Ferguson reassured the session of its dependability.

Discussion of the question "How Can We Improve Follow-up Work Leading to Correction of Remedial Defects" brought out:

1. The paradoxical fact that in places where comparative studies are made at entrance, during progress, or at the end of the college course, it has been found that while remedial defects decrease, health habits become steadily worse.

*Presented before the American Student Health Association, New York City, December 29, 1938.
†Health Service, Stanford University.

2. The practice of removing or correcting remedial defects varies a good deal in different places. Only one place was reported where all students with remedial defects are sent to the local hospital for treatment. In some places certain defects are corrected, while others are recommended for correction. Such recommendations are made in personal conferences with the student in some institutions, and by letter to the student in others.

3. There was a lively discussion of whether health advice should be made compulsory, semi-compulsory, or should be merely friendly advice. It was pointed out that correction of defects under compulsion may end disastrously and that it is more advisable to urge certain corrections be done by the family physician at home.

4. The cost to the state or to the college of financing higher education was advanced as an economic reason for graduating healthy students.

The best method of financing student health work was found to differ in each locality. In most instances the health service is financed from student fees. Since most of the health services felt the need of better support, several suggstions were made:

1. Since the entrance examination functions for administrative purposes as well as for the good of the student, it may be paid for from general or tuition fees, leaving health fees for the care of illness.

2. Where health education as formal instruction is undertaken by the staff of the health service, a part of its salary should be met from general teaching funds and not only from student health fees.

3. It was suggested that we consider defects present at the time of matriculation not a responsibility of the health service, and charge for their correction, adding money so obtained to health service funds. These conditions might include pathological tonsils, hernias, refractive errors, etc.

4. In certain localities it has been possible to make use of army and navy physicians to help with entrance physical examinations. Because of variation in this opportunity in different places and at different times, it was suggested that the problem of making the best use of help from this source available to as many as are interested in it be investigated by the officers of our organization.

5. The inclusion of faculty in the student health service benefits was touched upon briefly. In general, faculty are not included. Where faculty benefit by a health service it is usually in a limited way and called for by only a small number of faculty members.

It was pointed out that industry presents a solid front in demanding certain standards of health and physical fitness of its employees. This emphasizes the possibility and the necessity for establishing standards of health for students. Certain students now shop about among teachers' colleges and various state universities for a place in which their defects will be overlooked. Uniformity of standards would help to defeat this tendency. In certain places some method of excluding from the teaching profession the emotionally or mentally unprepared is being sought and demanded. The problem of certification of teachers is of great importance to the group representing the teacher-training institutions.

The possibility and desirability of setting up health standards for certification of teachers was reported on by Dr. Snow. Certain difficulties were recognized as follows:

1. State and tax-supported colleges cannot easily refuse admission to students who want to register. Connecticut is the only state which has a definite law listing certain defects which will exclude students from its teacher-training institutions.

2. Most teacher-training institutions must admit all students desiring to enroll and are faced at the end of the second year with the necessity of advising certain students against continuing their courses.

3. All present agreed that some selection of students is necessary. It was suggested that teachers should be "able-bodied", which was defined as being: (a) able to perform their duties in a capable manner; (b) have the ability to see and hear across the classroom; (c) be able to play with their students.

Certain objections were raised to each and every item listed as a cause for refusing certification of teachers. However, it was felt that such problems should not be solved by the health service alone, but must be considered coöperatively with the personnel department or placement bureau.

4. The question "Can the Handicapped Student be Placed in a Teaching Position when He Finishes His Training" was debated. There is a growing demand for teachers of handicapped children which provides places for some teachers in special schools, for example, for the care of orthopedic cases, or blind or deaf children.

5. No definite conclusions were reached as to the items to be included in a list for which certification of teachers would be refused. It was decided that every teacher in training should be considered individually.

Doctor Ritenour discussed certain health service problems from the point of view of the college administrator. He pointed out that:

1. Parents expect the college to take an interest in each student and care for him when ill.

2. If no full-time doctor is employed by the college for this purpose, there is likelihood that a charge of favoritism may be lodged against any part-time doctor in such a position by the local private practitioners.

3. The limits of health care by the college were discussed and the question raised as to responsibility for surgery, etc.

4. It was recommended that students be admitted to college only after passing the college physical examination to avoid wasting taxpayers' money by admitting ill students.

Doctor Blydenburgh's group discussed development of clinic service and infirmary or hospitalization facilities.

1. They felt that these questions could not be answered in detail for every group; they have to be answered by each institution, and the answers would depend a great deal upon location, financial resources, personnel and type of student.

2. However, the answers should be made with the idea in mind that the college is not in the practice of medicine; it is not in the business of running what is usually understood as a dispensary or a hospital. It is running a health service in which these two agencies help the institution to give health instruction, find and correct, or urge correction of defects, prevent disease as much as is possible, and give minor and emergency therapeutic aid.

3. The answers also should be shaped by the realization that most of the students in our group are minors away from home, usually without much money. The institution through its health service needs in a restricted way to act for and in place of parents. This means supervising the student's health in giving treatment and in providing an adequate place for the bed care of those complaints which in most cases would be in bed at home.

4. Various kinds of hospital insurance for student groups were also discussed, but it was pointed out that hospitalization, carried out in the usual student hospital, not undertaking responsibility for the treatment of serious medical or surgical cases, was quite different from the hospitalization usually considered in such hospital insurance plans. It was thought, however, that these plans might be useful in caring for hospitalization beyond that offered by the college.

Doctor Hiller reported extensive discussion of various health and hospital insurance schemes that have been tried by various colleges not maintaining infirmaries or hospitals for students. At Wellesley an accident insurance scheme was tried and discontinued. At Radcliffe a commercial insurance company gave coverage for one year and then discontinued the service. At Vassar a non-profit plan providing a rather complete coverage was tried, but so many students had operations during the summer vacation that the cost of coverage was raised from $12.00 to $15.00 per year. The Antioch Plan giving consultation and laboratory service was found very satisfactory where the college is located in a small town remote from a large city or a medical school.

It was felt that the entrance physical examination should include all the valuable aids to diagnoses that are possible to get.

It was recommended that all the information obtained about a student should be discussed with him as an educational tech-

nique in an attempt to teach health principles. An effort should be made to keep in close contact with the family doctor on all health conditions that develop while a student is in school

It was recommended that the health service try to penetrate the educational field, in an attempt to check the growing tendency of allowing a student a load too heavy for his best health interest. It was pointed out that pressures should be regulated in student loads of outside social activity as well as academic work.

Dr. L. B. Chenoweth in reporting for Dr. Woll, pointed out that the health service problems of municipal universities differ from others in that most of these students live in their own homes.

1 It was felt that students with physical defects should be referred to their own family physicians. At the College of the City of New York the family of the student is called into consultation whenever a health decision is made. If surgery is necessary it is required to be done before the student is allowed to register.

2. Students must have certain physical defects corrected or be excluded from classes.

3. Periodic health examinations are considered a very important part of the work of the health service. This is really a continuation of school health examinations done at the secondary level and should be made an educational process. The aim is to help the student develop the habit of periodic health examinations.

4. At the College of the City of New York physical examinations are not given the whole student body, but are given in certain departments only. In other colleges all freshmen are examined. It was found generally true that Schools of Education always ask for the most service.

5. Municipal universities have a special problem of keeping good relations with a local medical society. At the College of the City of New York records are kept of fees paid and of the number of cases referred to local doctors. At Wayne University 2500 students were referred to outside doctors in one year.

6. The problem of diagnoses of the family physicians not concurring with the college physicians' diagnoses was discussed. It was decided that the diagnoses of family physicians must always be taken, if trouble is to be avoided.

Hyperimmune Human Serum in the Prophylaxis and Treatment of Pertussis

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EVALUATION of convalescent serum in pertussis is very difficult. Because of the length of the incubation period and the extreme variability of the disease, results are hard to interpret. However, the seriousness of the disease in infancy and the fact that whooping cough and its complications cause so many deaths under the age of two, makes it necessary that we try rational new methods of treatment. Meader[1] reviewing the board of health statistics of Detroit from 1920 to 1927 found the following mortality per 100 cases reported:

Year	Cases Reported	Deaths per 100
1920	2,790	4 9
1921	2,691	4 0
1922	2,469	3 6
1923	2,745	3 0
1924	2,062	2 8
1925	3,305	2 6
1926	3,041	2 9
1927	3,646	1 7

Since 1928 convalescent serum has been used in the prevention and attenuation of pertussis in Detroit. Considering the large number of cases involved, perhaps the lowering of the death rate from pertussis before and after serum introduction may be significant.

The statistics for the ten year period from 1928 through 1937 follow:

Year	Cases Reported	Deaths per 100
1928	5,395	1.6
1929	4,100	2 2
1930	3,467	1 3
1931	5,389	1 2
1932	5,922	1 3
1933	4,986	0.9
1934	4,304	0 7
1935	5,587	0 8
1936	7,433	0 6
1937	3,352	0 7

This type of analysis gives us some basis for conclusion as to the merit of a given form of treatment, but of course is not a controlled experiment. Meader followed 183 children exposed to whooping cough and found that 121, or 66 per cent of them developed the disease. With this as a control he studied 115 children who had been given prophylactic serum and found that 28 per cent developed the disease. Debré[2] gave injections of 2 to 3 cc. of pooled serum to forty infants. Thirty-one were completely protected, in six whooping cough developed, and three suffered from the disease in average intensity. Debré believed that convalescent serum given during the period of incubation completely protected the exposed child; that given at the end of the incubation period resulted in attenuation; and that given after the disease was well established had no great effect. Bradford[3] ran a controlled series of cases exposed to pertussis in the family to determine the effect of con-

valescent serum and whole blood when given during the incubation period and during the catarrhal stage. When convalescent serum was given to 27 children in the incubation stage, 15 or 55 per cent contracted whooping cough. Ten, or 66 per cent, had a mild form, and one had a complication consisting of tonsillitis in the sixth week. Of 20 controls, all of whom developed the disease, eight, or 40 per cent, had a mild attack; four, or 20 per cent, had complications consisting of otitis media, bronchitis, and pneumonia. When given during the catarrhal stage, the resultant disease was about the same in the treated and control groups, except that the controls showed one pneumonia out of 13 cases.

Stokes, McGuinness, and Armstrong[4] have recently made use of hyperimmune pertussis serum. Young adults giving a history of pertussis were given three complete series of Sauer's vaccine at intervals of three months. The serum from these donors was found to have a high agglutination titer, 1–5,000, and a high opsonocytophagic index against Hemophilus pertussis. The above workers used this serum to study its effect on the prophylaxis and treatment of whooping cough. Their results are tabulated in the following tables:

Philadelphia Serum Exchange Whooping Cough Prophylaxis Hyperimmune Human Serum (Lyophile) 81 Cases

	No Disease	Very Mild Disease*	Mild Disease**	Moderate Disease
Intimate Exposure (continuous)	44	5	3	3
Intimate Exposure (short duration)	5	5	0	0
Casual Exposure (includes ward contacts)	16	0	0	0
Totals	65 or 80.3%	10 or 12.5%	3 or 3.7%	3 or 3.7%

*No whooping or vomiting, mild cough of short duration.
**Whooping, but no vomiting, short duration.

Dosage of Serum Used

10 to 20 cc. depending on age of child and intensity of exposure. Serum injection should be repeated in 5 to 7 days.
4 cc. of diluent used for each 10 cc. of original serum. (Serum is distributed in desiccated state).

Philadelphia Serum Exchange Whooping Cough Treatment Hyperimmune Human Serum (Lyophile) 100 Cases

Result	Number of Patients
Excellent	32
Good	31
Moderate	20
Questionable	14
Deaths	3*

Dosage of Serum Used

10 to 20 cc. repeated 3 or 4 times.

4 cc. of diluent used for each 10 cc. of original serum.

*One child died four days following the initial dose of serum, one child died within 36 hours following the initial dose of serum, and the third child died within 24 hours following the initial dose. All three cases had bronchopneumonia.

Experimentally, Bradford[5] has contributed much fundamental research. He has shown that intratracheal inoculation of H. pertussis into a mouse will produce consistently uniform findings in the lungs. He has made use of investigations of humoral immunity in pertussis chiefly directed toward studies relating to specific agglutinins and complement-fixing antibodies. One direction his recent work has taken concerns the study of the opsonocytophagic reaction of the blood, as suggested by Veitch and applied by Huddleson.[6]

The opsonocytophagic reaction is a test for the opsonizing antibody in the serum as well as for the phagocytosing power of the leukocytes. The technique of determining the opsonocytophagic reaction consisted of mixing 0.05 cc. of whole blood obtained as it flowed freely from a small incision in the finger tip, with 0.05 cc. of 1 to 1,000 solution of heparin or physiological salt solution. To this was added 0.05 cc. of a standard killed (merthiolate 1–10,000) suspension of Phase I H. pertussis organisms containing approximately ten billion organisms per cc. The organisms were added within 30 minutes after the blood was withdrawn, the mixture was shaken and placed in a 37° C. water bath for 30 minutes. A second shaking was done after 15 minutes of incubation. At the end of the 30 minute period, without further shaking, smears were made, fixed with methyl alcohol, and stained by the Giemsa method for 20 minutes, washed, dried, and examined under oil immersion.

A series of 25 consecutive polymorphonuclear leukocytes were examined and the organisms engulfed in each were counted. The cells were then classified according to the number of organisms engulfed. Three arbitrary groups were used to denote the degree of phagocytosis as follows:

None to slight	0 to 4 organisms
Definite	5 to 19 organisms
Marked	20 or more organisms

He studied this reaction during and after pertussis.[7] The table below shows the opsonocytophagic reaction of the blood during the course of pertussis:

		Distribution		
Week of Disease	Patients Tested	0—4	5—19	20 plus
1 and 2	13	2.8	18	4.2
3 and 4	15	1.3	14.5	9.2
5 and 6	12	0.8	9.5	14.6
7 and 8	9	0.6	8.6	15.1

As convalescence approaches there is an increase in the cells in the 20 plus column and a decrease in the other two.

Comparing children of various age groups who gave no history of pertussis with those who have a positive history of pertussis, it was shown that the latter had a higher opsonocytophagic index. It was noted, however, that older children gave a moderately high test because of the presence of normal opsonins. Comparing the blood of mothers with that of their new-born babies, Bradford found that babies of mothers with a history of pertussis gave a higher test than the others. This

suggests placental transfer of the antibody in certain instances.

In vitro experiments conducted along similar lines except for the addition of 0.05 cc. of immune adult serum increased the opsonocytophagic index markedly.[8] Because of the increase in the opsonocytophagic reaction in the blood of individuals who have a history of pertussis and were subsequently hyperimmunized, this procedure has been recommended by Bradford to make available a group of donors for convalescent serum. At a recent meeting of the American Pediatric Society,[9] he reported his results and recommended highly the use of hyperimmune donors. He found that hyperimmune (lyophile) serum protected young mice against death from experimentally induced infection with H. pertussis, when the serum was injected at the same time that the organisms were administered.[10] Thirty-two from a group of 40 treated mice survived, while only four survived from a group of 40 controls. The degree of lung involvement in the treated group was definitely less than in the controls. The difference between the groups in respect to the number of mice showing negative lung cultures at autopsy was also statistically significant. Sulfapyridine, in daily dosages of 20 mg. per mouse administered for three days failed to protect either three or six weeks old mice. Combined treatment, consisting of sulfapyridine by mouth and immune serum by injection, protected both three and six weeks old mice, but the protection was no greater in the younger animal than that produced by the serum alone. He also tested the effect of hyperimmune human serum (lyophile) upon the humoral antibody titer in pertussis. A group of 19 infants and 3 children in the early stage of pertussis were treated by the intramuscular injection of from 10 to 40 cc. of hyperimmune human serum (lyophile). In 19 of the group, the opsonocytophagic reaction and agglutinin titers of the blood were determined immediately before and after serum injection.[11] The humoral antibodies as measured by these methods were increased to levels comparable to those characteristic of convalescence. A definite decrease in the absolute number of lymphocytes in the blood was noted in 15 of the 22 cases, and there was apparent improvement in the clinical course of the disease in 18 of the 22 cases treated with the serum.

The Human Serum Laboratory has prepared hyperimmune serum by actively immunizing a group of medical students, all of whom give a history of pertussis. They have received three courses of vaccine at three months intervals, and have a high agglutination titer against H. pertussis. In the light of the findings with the use of hyperimmune human serum in pertussis, it is recommended that this material be more widely used. The period of early infancy is practically devoid of protection against pertussis. Since the mortality rate is so high at this time, it would seem wise to offer passive immunity in case of exposure or actual disease. Prophylactic use of 10 cc. of hyperimmune serum and therapeutic use of 20 to 40 cc. has been recommended. The latter is of greatest benefit when given early in the disease.

The University of Minnesota Human Serum Laboratory located at the University Hospital has a supply of this serum ready for distribution.

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Further Observations on Allergy to Smuts

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SINCE 1924 the accumulated evidence of many observers has shown that fungi play an important role in allergy. The common air molds, yeasts, pathogenic skin molds, grain smuts and rusts have all been mentioned as factors.

Stakman[1] and his coworkers made observations as early as 1923 on the prevalence of spores of the upper air with particular reference to smuts and rusts. Cadman[2] in 1924 reported cases of allergy due to grain rust. Wittich and Stakman[3] reported a case of grain smut respiratory allergy of twenty years' duration, when the patient was not only sensitive to the grain smuts, but the offending smuts were present in his sputum. The patient was hyposensitized with smut extracts to apparently a complete clinical recovery. The author observed that smuts frequently augmented the severity of the grain sensitive patients.[4,5] Recently Harris[6,7] reported 13 cases of seasonal allergic rhinitis and asthma where carefully controlled experiments suggested grain dust and grain smut as definite etiology. He also indicated a possible close antigenic relationship between the grain dust and the grain smuts. Waldbott and Ascher[8] recently observed seven patients in the Detroit area "who had symptoms exclusively during the rust and smut season" and twelve "who suffered definite exacerbations at the time." They obtained stronger skin reactions with rusts than with the smuts and believe that rusts are a more important antigenic factor in their region.

Smuts, rusts and the common air molds were very prevalent last season, owing to the normal or excessive moisture and favorable temperatures. Smuts were observed in large numbers before, during and following the grass and weed pollinating seasons until frosts and snowfall. Some patients with hay fever and asthma were observed during the seasons of 1937 and 1938 who showed severe symptoms when the pollen counts were very low, and they had received adequate treatment for their pollen allergy. Recent systematic studies of the air content during the hay fever season showed smuts in many localities to be far in excess of the pollens and common air molds.

Biology of Smuts

Smuts are obligate parasites. They are minute thread-like colorless plants or mycelium, and with few exceptions enter the young seedling plants, establishing themselves in the growing point of the plant, and grow up with the "host," remaining invisible until the heads of grain appear. These florets are replaced and partially or wholly destroyed by masses of dark-colored spores called smut. Most serve to propagate by getting on or in the seed, where they start to grow again with the grain when it is planted. The stinking smuts of wheat may overwinter on the seed or in the soil. In the Pacific Northwest this soil-borne inoculum is a serious problem in the propagation of smut. Corn smut may overwinter in soil; in silage; it grows saprophytically in soil and manure piles and may attack any above-ground growing part of the plant so that the galls usually represent localized infections. These smut masses are disseminated by the winds and are chlamydospores from which promycelium develops which in turn gives rise to sporidia. These give rise to the mycelium which enters the plant. Smuts are grouped into two families, of which there are over a hundred species. There may be two or three species for a single cereal, as there is for wheat, barley, rye, rice, oats, corn, sorghum, wild and cultivated grasses, as well as common plants like the onion, spinach and sunflower. Figure 1 shows a few of the commoner smuts of wheat, corn, rye, oats and barley together with one of rust and a few granules of ragweed pollen taken at the same magnification for comparison. The nitrogen content of several of the common smut spores is shown compared with that of ragweed and grass pollens in table I. The nitrogen content of smutted grain dust is proportionate to the amount of smut which it contains. As the smuts are obligate parasites, it is reasonable to expect some of the grain substance to be contained in its corresponding smut, and there is evidence that some synthesis does take place. This may account for the cross reactions with mill dust, as the more smutted the mill dust the more severe the symptoms. Guinea pigs sensitized with alum precipitates of grain dusts and "shocked" with their corresponding smut would indicate an immunologic relationship.[12] Their antigenic relationship has also been shown by the Dale test. Grain smut allergy is not to be confused with mill dust allergy. Patients have hay fever and asthma who are sensitive to smuts and who are not sensitive to mill dust unless it contains its corresponding smut.

Prevalence and Distribution of Smuts

Further observations were warranted to determine the relative clinical importance of grain smut allergy, especially in the grain and milling centers of the Middlewest and Northwest.

Smuts occur wherever there are grains and grasses, but are most numerous in areas where conditions favor their infestation. The Middlewest and the Pacific Northwest are areas where smut is produced in enormous quantities. However, they are numerous at certain times in other states, especially the Southern and Southwestern states.

It is estimated that wheat smut alone reduces the yield of that grain annually about 25,000,000 bushels and the dockage for smutty grain totals $10,000,000 each year.[10]

The grain mold spore count was extremely high during the summers of 1935 and 1936 in this region because of periods of drouth, low humidity and high dry winds.

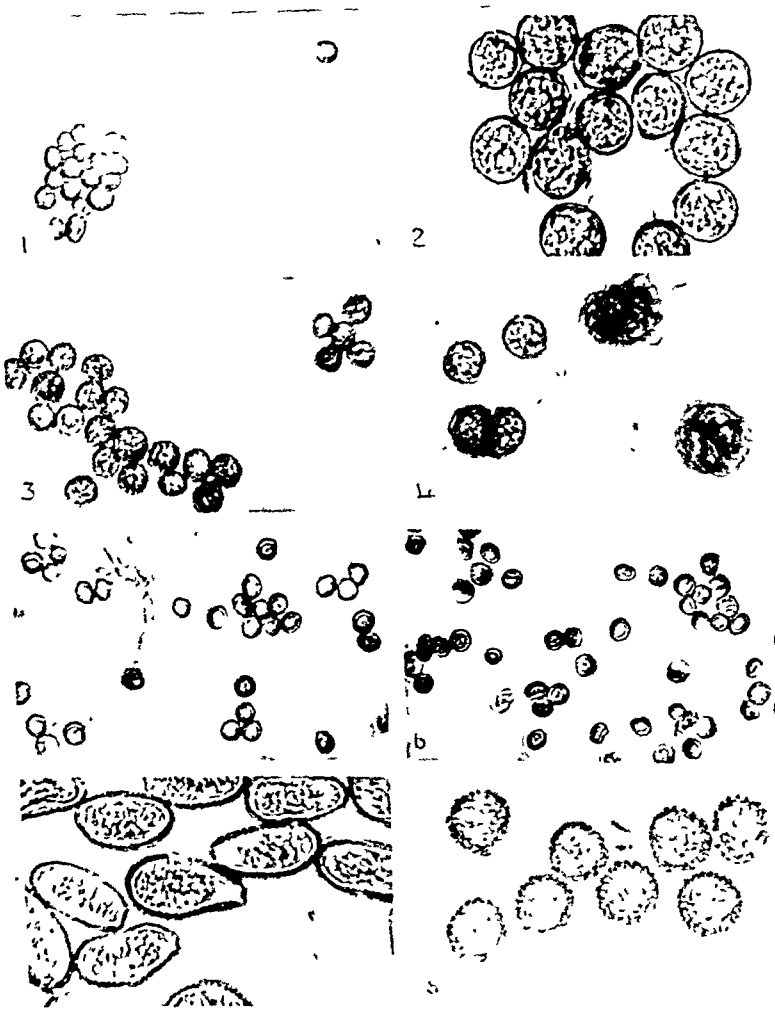


Fig 1 Photomicrograph of grain smut spores Wheat rust and ragweed pollen shown for comparison Magnified 430 diameters A detailed description of spores can be obtained from Heald's "Manual of Plant Diseases"[10] or Steven's "Plant Disease Fungi"[12]

According to Stakman,[3] during the season of 1935, corn smut in certain areas reached a million spores per square foot in 24 hours. Heald[11] states that spores of the stinking smuts or bunts of wheat may be numerous in mill dust, as a single smutted wheat kernel may contain 6,000,000 to 9,000,000 spores. He also estimated that during the harvesting or threshing time in the wheat-growing district of the Palouse country of eastern Washington, 5,000,000 may fall on each square foot of soil. The "smut showers" begin in August, reach their maximum about the middle of September and then gradually subside.

Minnesota plants approximately 10,000,000 to 15,000,000 acres of corn, oats, barley and wheat annually, while the Dakotas combined plant that much wheat alone.[13] Hennepin County, in which Minneapolis is located, planted 11,000 acres of wheat and twice as much corn. The heads of wheat blossom in Minnesota usually from June 22 to June 27, and the heads appear ripe after that, so that the harvesting time for this winter grain is between July 17 and July 23. At this time the infected or smutted heads commence to throw off the black smut dust in countless numbers. The spores are widely dis-

Percentage of Nitrogen by Weight of Grain Smuts and Pollens (Kjeldahl Method)

Grain Smuts	% of N_2 by Weight	Pollens	% of N_2 by Weight
Wheat— Covered smut (stinking smut) Tilletia tritici Tilletia levis	3 20%	Timothy	5 35%
Loose smut—Ustilago tritici	3 80		
Oats— Covered smut— Ustilago avenae Loose smut— Ustilago levis	2 63	June Grass	4 85
Rye smut— Urocystis occulta	3 05	Short Ragweed	4 90
Corn smut— Ustilago zeae	2 68	Giant Ragweed	5.11

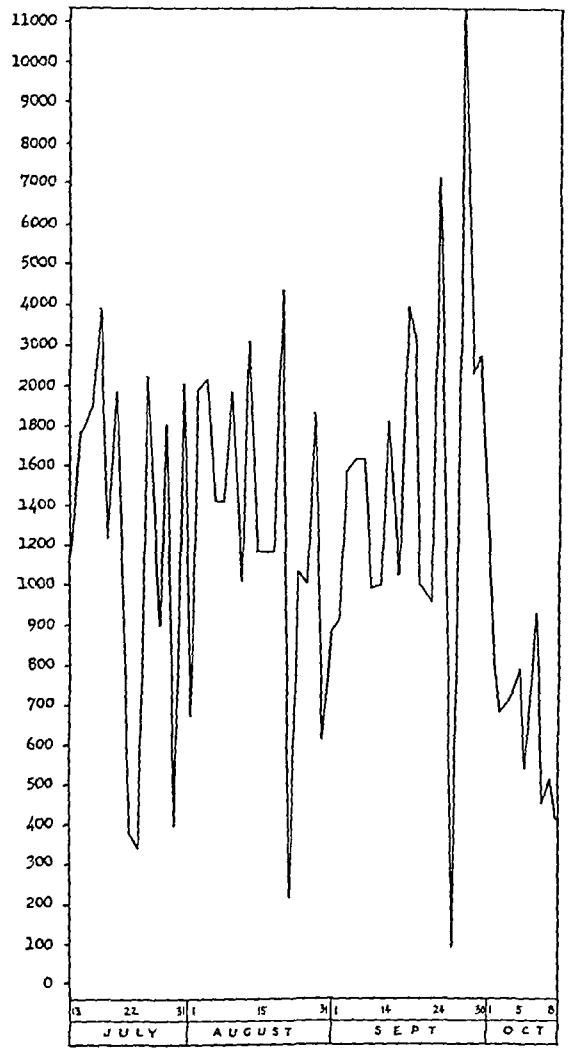


Chart 1. Daily smut spore count from July 13 to October 8, 1938, at Wayzata, Minnesota. The figures on the scale represent the number of smut spores found on a slide area of 1.8 sq. cm.

seminated by the high dry winds which are quite common.

Smuts appear in large amounts near the grain storage centers in Minneapolis. The various grains are shipped near the city and samples sent for inspection. Over 3,000 workers about the grain exchange are engaged in inspecting, sorting and conveying the grains, while thousands of workers are employed in the flour mills and grain elevators. Disastrous mill dust explosions have occurred. Most of the buildings are old and contain a great deal of mill dust and many molds. Smut spores are extremely combustible when beaten up into a dust because of their oily nature. Cases of contact dermatitis are seen, as well as the atopic forms of skin allergy, perennial rhinitis and asthma, not only among those handling the grains but those employed in nearby offices. Slides exposed for 24 hours inside of the offices within six blocks of the grain exchange showed numerous grain smuts, rusts and other molds. Charts 1, 2, 3 and 4 show the daily total smut count of four representative stations in Minnesota from July 1 to October 31, 1938. These counts were made through a fertile grain belt in Minnesota extending from the Dakota line eastward. Chart 5 is a comparison of the smut counts for 1937 and 1938 at one of the stations.

During late June and early July the loose smut of winter wheat, barley, oats and grasses are in the air. The harvesting periods of August and early September free the stinking smuts or bunts of spring wheat. After late July the corn smut appears. In the fall, when the corn is stacked and allowed to stand in the fields, the large smut balls are broken up and disseminated so that the corn smut spores are found in large numbers until snowfall. A survey made in 1937 showed a corn smut shower of 174,000 spores per 1.8 sq. cm. surface area during a high west wind following several killing frosts.

Smuts, therefore, appear in large numbers during and between the grass and weed pollinating seasons. They predominate numerically the common air molds appearing at the same time. It would seem that they are responsible, in part at least, as well as the common air molds, for some of the symptoms of hay fever and asthma occurring between and after the pollen seasons and for otherwise unaccountable exacerbations during the pollen seasons.

Smut Spore Counting

Smut spore counting and identification is relatively difficult, compared with that of the common air molds. It is necessary to use a magnification of nearly 500 diameters, and this of course must be taken into account when estimating the accustomed unit of 1.8 square centimeters used for pollens.* The gravity slide method of collecting the molds was used. Slides, very thinly coated with vaseline, were exposed for 24 hours at "ground level" at four stations westward from Minneapolis to the Dakota line. These districts take in a very fertile corn, barley, oats and wheat belt.

Clinical Observations and Methods

All of the smut spores used in these observations were furnished by the Department of Plant Pathology of the University of Minnesota. They were sifted through a motor driven shaker mill-sifter with a five drawer compartment of graduated meshed wire gauze and silk cloth, the finest being 200 mesh per square inch. The chlamydospores were then checked microscopically. Cultures of smuts resulted only in the growth of mycelium and sporidia which are not suitable as antigens.

For intradermal testing, .03 to .05 cc. of a 1:500 or 1:1000 dilution of a 3 per cent extract of the smut spores in buffered isotonic dextrose solution with 0.5

*For uniformity this method was used in counting the smuts that appear in the accompanying charts. However, there is much need for the universal adoption of a correct standard unit of surface area to be counted in estimating the number of microscopic particles of varying dimensions settling by gravity on a given area of surface in 24 hours. Smut spore identification and counting is made easier by carefully placing a drop of cedar oil on the exposed specimen slide and gently placing a 25 mm. cover slip so that its edges correspond with that of the ordinary slide and the spores are not disturbed. This prevents the dispersion of light and the spores are more clearly defined.

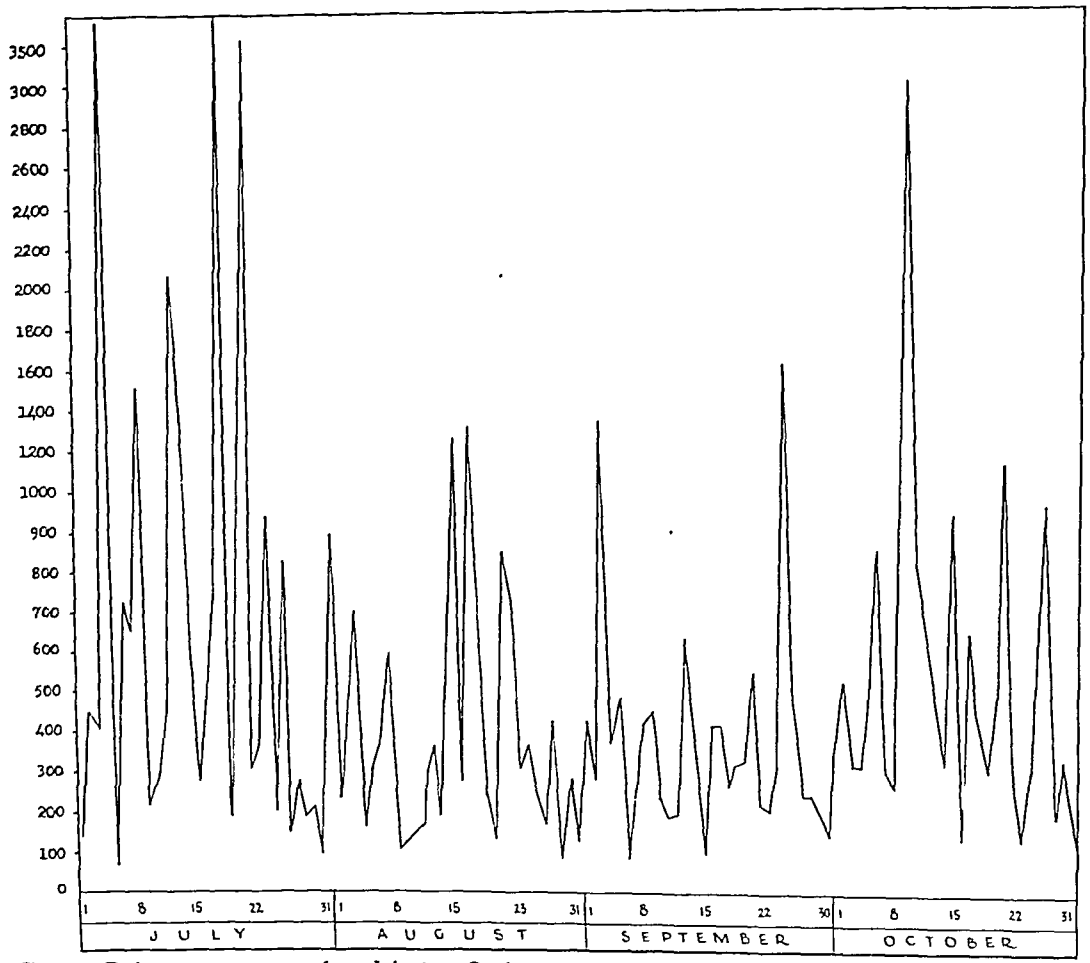


Chart 2 Daily smut spore count from July 1 to October 31, 1938, at Anoka, Minnesota. Other data as under chart 1.

per cent phenol was used. Skin tests were done by the scratch and the intradermal method. Together with smut testing, routine common air molds were used as well as yeasts, pollens, animal emanations, dusts and foods—especially the grains and various mill dusts.

Of 105 patients of respiratory allergy whose history warranted testing for fungi, 52 had asthma, 26 had hay fever and 27 had both. Fifty-six per cent were sensitive by skin tests to the pollens, 42 per cent to animal emanations and miscellaneous inhalants, 35 per cent to foods, 23 per cent to the common air molds, 23 per cent to smuts and 10 per cent to yeasts.

Results of 24 patients showing skin sensitivity to smuts are shown in table II. The clinical histories, skin reactions, successful passive transfers, as well as the symptoms produced by blowing smut powder into the nostrils, suggested that the first eight cases in the table represented primary smut allergies. The majority of cases, however, showed equal or greater sensitivity to pollens, common air molds or other inhalants, so that the value of the smut allergens is very difficult to determine.

COMMENT

One must keep in mind that smuts grow hand in hand with the weeds, grains, grasses, etc., that the ni-

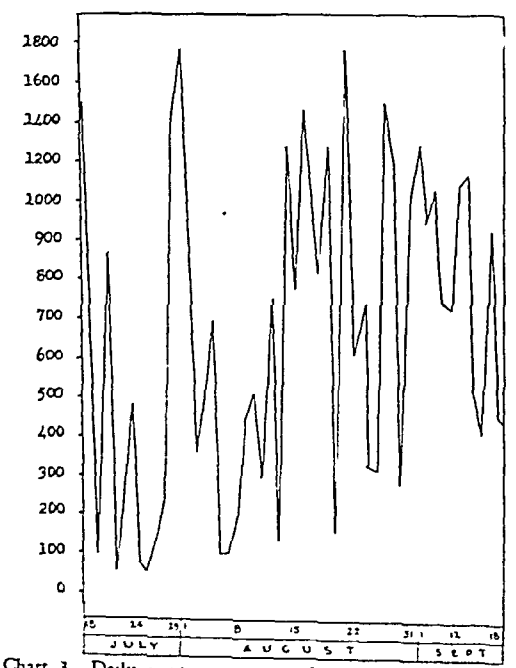


Chart 3 Daily smut spore count from July 18 to September 19, 1938, at Olivia, Minnesota. Other data as under chart 1.

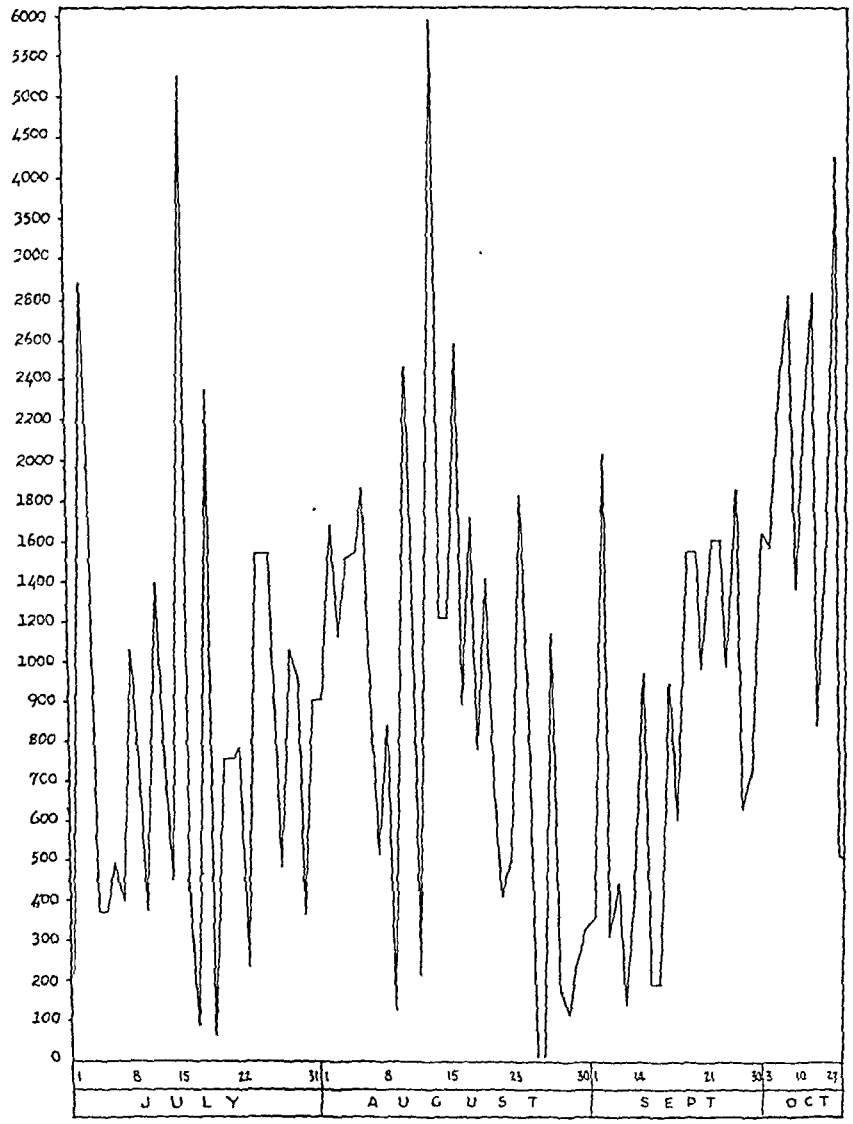


Chart 4. Daily smut spore count from July 1 to October 27, 1938, at Morris, Minnesota. Other data as under chart 1.

trogen content nearly equals that of the grass and weed pollens, that many being smaller are more widely and highly distributed by the air currents, and that their smaller size compared with *Alternaria*, is made up by their superior number in the air in the grain growing areas.

In smut areas, pollen allergy is complicated by grain smut sensitivity depending upon the flora and crops together with other conditions of that particular section.

During a season of luxuriant plant growth, as in 1937, when as high as 30,000 units of ragweed antigen were given as hyposensitizing doses, patients showing smut sensitivity did not show complete recovery until smut extracts were used. This and other factors point to the importance of smuts as a clinical cause of hay fever and asthma in grain growing sections.

I am impressed by the fact that in our area favorable conditions for producing grain smut sensitivity prevail because of the daily handling and storage of grain. There is adequate contact and sufficient antigenic stimulation, augmented by the non-specific factors: wind and dust.

SUMMARY

1. A systematic survey was made to determine the prevalence of grain smuts, rusts and common air molds, in relation to pollens at various representative areas in Minnesota. Grain smuts were shown to predominate and occurred in larger numbers, before, during and after the ragweed pollinating season.

2. Smuts have been proven to possess a definite excitant of hay fever and asthma.

TABLE II. RESULTS OF 24 PATIENTS SHOWING SKIN SENSITIVITY TO SMUTS

CASE HISTORY	OTHER REACTIONS	WHEAT Bunts		WHEAT loose	OAT (combined) cov'd loose		BARLEY (combined) cov'd loose		RYE	CORN	SORGH'M (combined) cov'd loose		MILLET
		Tilletia tritici	Tilletia levis	Ustilago tritici	Ustilago avenae	Ustilago levis	Ustilago hordei	Ustilago nuda	Urocystis occulta	Ustilago zeae	Sphacelotheca sorghi	Sphacelotheca cruenta	Ustilago crameri
1 L S Male 48, electrician. Asthma when employed around the flour mills	Pollens negative, Common Air Molds negative	+++	++	+	+		+		+	++	++		+
2 A B Male, 55, clerk flour mill office Perennial asthma Slides exposed at office show high smut count	Ragweed +++ Mixed Grain Mill Dust ++ Air Molds negative	+	+	+	—		+		++	—	—		—
3 F D Male, 45, Railway mail clerk. Severe asthma in summer only when on route through grain belt	Pollens negative Mixed Grain Mill Dust +++ Air Molds +++	++++	++++	+++	++++		++++		—	++	+		—
4 W H Female, 42, housewife, suburb Severe seasonal hay fever—no response to adequate pollen therapy Complete relief after smut hyposensitization	Ragweed ++++ Mixed Grain Mill Dust ++ Air Molds +	++++	++++	++++	+++		+++		++++	++++	+++		+
5 D M Male, 40, clerk in the milling district Asthma from middle of July long after frost	Pollens negative Mixed Grain Mill Dust ++ Air Molds ++	++++	++++	++++	++++		+++		++++	+++	+++		+
6 D F Male, 30, clerk in the milling district Hay fever early July to snowfall.	Ragweed +++, Mixed Grain Mill Dust +++, Air Molds +	+	+	+	+		—		+++	++	—		—
7 E W Female, 20, student Farming district Asthma worse in Summer and Fall General reaction following rye smut intradermal 1 500	Ragweed ++++ Grain Mill Dust Mixed +++ Air Molds +	+++	++++	+++	+		+		++++	+	—		—
8. S S Male 44, feedmill operator Works with oat feed Perennial asthma that is worse in the summer.	Pollens negative, Mixed Grain Mill Dust ++, Air Molds neg	+	+	+	++++		—		++	—	+		+
9 J M Male, 30, brewery employee Perennial rhinitis	Pollens negative, Mixed Grain Mill Dust ++, Air Molds neg	—	—	—	—		++		+	++++	++		—
10 G G Male, 40, clerk in the milling district Perennial asthma Seasonal hay fever.	Ragweed +++, Mixed Grain Mill Dust +, Air Molds +++	+	+	+	+		++		—	++	++		+++
11 S B Male, 36, country store Perennial asthma	Ragweed ++, Mixed Grain Mill Dust +++, Air Molds +	+	+		++		++		—	+	+		—
12 A D Female, 34, teacher Fall hay fever Perennial rhinitis	Ragweed ++++, Mixed Grain Mill Dust ++, Air Molds neg	+++	+++	+++	++		—		+	+	—		—
13 R. E Male, 50, flour mill operator Perennial asthma and rhinitis Soy bean sensitive.	Pollens negative Mixed Grain Mill Dust +++ Air Molds +	+++	+++	+++	+++		++		++	+	+		—
14. H G Male, 19, student Lives in suburb surrounded by millet fields Perennial asthma and seasonal hay fever	Ragweed +++ Common Air Molds ++++	+++	+++	++	+		—		—	++++	++		+++
15 J L Male 30 clerk in the milling district. He suffers from seasonal hay fever	Ragweed ++++ Mixed Grain Mill Dust +++ Air Molds ++	+	+	+	+		++		++++	+	+		++
16 J M Female 37, lives near grain elevator Hay fever and asthma during Summer and Fall	Ragweed +++ Mixed Grain Mill Dust +++ Air Molds ++	+++	++	++	++		—		++	+	++		—
17 P S Female, 24 clerk in the milling district Perennial asthma Seasonal hay fever	Ragweed ++++ Mixed Grain Mill Dust negative Air Molds +	+++	+++	++	+		—		—	++	—		—
18 F W Male, 45, rural contractor Perennial asthma	Pollens negative Mixed Grain Mill Dust +++ Air Molds ++++	—	+	—	+		+		++++	+++	—		—
19. E W Female, 45, housewife residing near the grain elevators Perennial rhinitis and asthma	Pollens negative Mixed Grain Mill Dust ++ Common Air Molds ++	++	+	++	++		++		—	—	+++		—
20 R R Female 39 farmer's wife Perennial asthma and Fall hay fever	Ragweed ++++, Mixed Grain Mill Dust +++, Air Molds ++	+++	+++	+++	++		—		+	—	—		+
21 M R Female 19, farmer's daughter Perennial rhinitis and asthma	Grasses ++++ Mixed Grain Mill Dust ++++ Air Molds +++	++	++	++	++		+++		++	—	—		—
22 J S Male 10 resides in rich grain growing section Hay fever, Fall type Asthma from June until December	Ragweed +++ Mixed Grain Mill Dust ++++ Air Molds +++	++++	++++	++++	—		+		+++	—	—		—
23 F W Male, 20 flour mill night watchman. Perennial asthma Seasonal hay fever	Ragweed +++ Mixed Grain Mill Dust +++ Air Molds ++	+++	+++	++	—		—		—	—	—		—
24 G A Male 31, drug clerk Seasonal hay fever Perennial asthma.	Ragweed ++++ Flaxseed ++++ Air Molds ++++	+++	+++	+++	++		+		+	+++	—		—

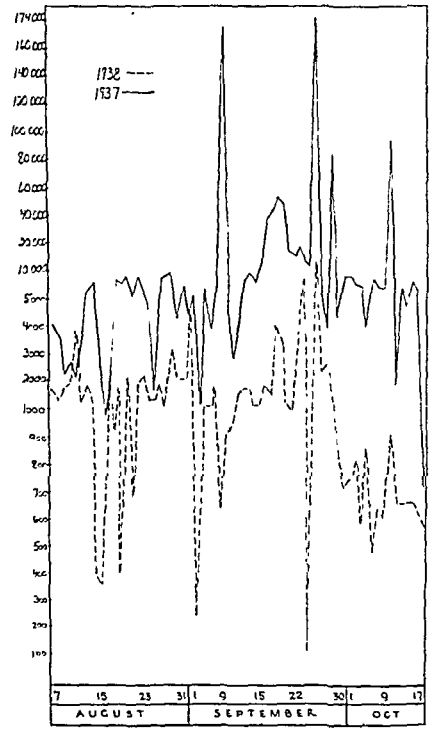


Chart 5. A comparison of the smut counts for 1937 and 1938 at Wayzata, Minnesota.

3. A clinical study of grain smut sensitivity compared with ragweed pollen and the common air molds of 105 patients with respiratory allergy was made. Smut sensitivity was considered the most important in eight cases of respiratory allergy.

4. Evidence is obtained which would indicate an immunologic relationship between the smuts and their corresponding hosts, the grains.

5. Sufficient evidence has been shown that a more systematic survey of air-borne fungi, in the various sections of the country, must be made to arrive at any definite conclusions.

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Infectious Equine Encephalomyelitis*

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AT the conference held in January, 1938, papers and discussions on sleeping sickness in horses were presented by Dr. Carl Ten Broeck, director of the Rockefeller Institute for Medical Research and Dr. Gochnauer of the Pathological Division of the Bureau of Animal Industry, United States Department of Agriculture. They furnished the latest information and review of the studies and investigations from a scientific standpoint of this disease at that time. There were other men on the program who had had practical experience in the control and treatment of the disease, who reviewed the history of outbreaks, the symptoms, the pathology and the results of the then known preventive and therapeutic treatments of the disease. During the past year, investigation and research by the workers in Dr. Ten Broeck's laboratory, the laboratory of the Pathological Division of the Bureau of Animal Industry and in other laboratories, have disclosed some very valuable information relative to the importance of this disease and its control. The most important and serious disclosures as a result of researches conducted by the various laboratories during the year is the appearance of this disease in the human family; thus disclosing that it is not only an economic problem to the horse owners, but that it may be a serious human health problem. They disclose that the virus causing encephalo-

*Presented before the Minnesota Horse Breeder's Association, January 18, 1939.

myelitis in horses is the same virus that produces outbreaks of some types of encephalitis in man and encephalomyelitis in ring-necked pheasants and pigeons.

I will try in this paper to furnish a review of the reported scientific investigations and studies in the past year of the disease, the preventive measures to control it and to keep the incidence and mortality as low as possible. I trust that as a result of the knowledge the scientists now have that further research will determine the reservoirs that keep the virus alive in a territory from one year to the next, thus furnishing new measures by which the disease can be controlled and eliminated.

The data relative to the incidence or appearance of this disease throughout the United States during the summer and fall of 1938 was presented at the meeting of the United States Livestock Sanitary Association in Chicago on December 1, 1938 by Drs. Shahan, Giltner and Schoening. They report that in 1935, there were a total of 23,000 cases of this disease reported in the United States. In 1936, a relatively dry year, which for this or other unknown reasons was apparently unfavorable toward the spread of the disease, only about 4,000 cases were reported. In 1937, the most severe epizootic ever experienced in this country occurred, about 170,000 cases being reported. They stated they have received to date reports from the various states of a total of 79,606 cases during the 1938 outbreak. An average mortality rate from 1935 to and through the outbreak of 1937 was maintained at about 25 per cent of the affected animals. The report of the 1938 outbreak shows a decline to about 21 per cent in the mortality of the sick animals. There is no doubt but that the Federal Bureau of Animal Industry will receive reports disclosing that there were materially more cases than the 79,000 cases reported to them on December 1st. The authors stated that on the basis of the information available at that time, they conclude that in 1938 there was less than one-half as many cases occurring throughout the United States than in the summer and fall of 1937. They further report there was a marked decrease of the disease in the areas that were affected in 1937 but that elsewhere the disease spread. They state that Connecticut, Illinois, Kentucky, Maine, Massachusetts, Michigan, Ohio and Rhode Island in which it had never previously appeared or if it had appeared, it was limited to only sporadic cases, suffered more or less serious losses in 1938.

Further research during the past year has confirmed the earlier findings that we have two distinct diseases. The form that appears in the east is due to the eastern strain of virus and is much more virulent than that which has appeared in the western sections of our country that is due to the western strain of virus. The mortality in horses that contract the eastern type of the disease ranges from 80 to 98 per cent. The western type is not as fatal and the percentage of deaths in animals has materially lessened since the outbreak in 1935. This, without doubt, is due to the fact that in the territory where the disease has existed in former years, the horse owners, through experience, have called their veterinarians immediately when the horse becomes sick and with proper care and treatment the percentage of deaths has been decreased to about an average of 21 per cent fatality in the affected horses during the outbreak of 1938. The outbreak due to the eastern virus is limited to the states along the Atlantic seaboard and has not appeared west of the Appalachian and Blue Ridge Mountains.

The difference between the two viruses that produce the two distinct types of the disease is that they do not "cross immunize." An animal that has recovered from the type due to the western strain of virus is immune to that particular virus at least for a period of one year. Dr. Schoening reports that the animal can be reinoculated artificially with the western virus and will not contract the disease whereas if inoculated with the eastern virus, it promptly becomes sick and dies. This is true of the eastern virus, an animal that has recovered from the eastern type can be reinoculated with the eastern virus and will not become sick, but if artificially inoculated with the western type, contracts the disease and dies. The authorities and investigators have shown that it is very important in undertaking to vaccinate horses that the proper type of vaccine be used in an area. It would not do to use an eastern type vaccine in a territory where the western virus is operating as no immunity could be expected from such treatment. The Bureau of Animal Industry reports that during the past year and also in previous years they have been paying particular attention to the location of the disease as it appeared in the various states with particular reference to determining the type that occurred in the state as the two different types of virus have remained quite distinct. The western type of the disease has remained in the west although it is slowly moving eastward and the eastern type is limited to the states along the Atlantic seaboard. During the past year fourteen strains of virus were recovered and sent to the United States Bureau of Animal Industry's laboratory and studied with the result that the eight strains of virus recovered in the 1938 outbreak from Massachusetts, North Carolina and Florida only proved to be of the eastern type, and six strains from Kansas, Minnesota and Illinois were found to be of the western strain of virus.

Drs. Shahan, Giltner and Schoening report, that since the identification by Drs. Meyer, Haring and Howitt of the causative agent of the disease in the western part of the United States and by Ten Broeck and Merrill, and Shahan and Giltner of an immunologically distinct virus in cases along the Atlantic seaboard, infectious equine encephalomyelitis has been diagnosed in 41 of the 48 states. Only nine states, namely, Alabama, Georgia, Mississippi, New Hampshire, New York, Pennsylvania, Tennessee, Vermont and West Virginia report freedom from the malady in 1938. Since 1931 actual recovery of the virus has been accomplished in 27 states. The eastern strain of virus has been typed in outbreaks of the disease in Delaware, Georgia, Maryland, New Jersey, North and South Carolina and Virginia. During the year 1938, outbreaks in Florida and Massachusetts were also identified as due to the eastern strain of virus. Viruses from California, Idaho, Iowa,

Montana, Minnesota, Nevada, North and South Dakota, Texas and Utah prior to the outbreak in 1938, had all been determined to be of the western type. During the summer of 1938, viruses obtained from cases in Kansas and Illinois were found to be due to the western type virus. Viruses obtained from the states of Colorado, Indiana, Louisiana, Nebraska, Ohio and Wisconsin have been disclosed to be of the western type either in the 1938 outbreak or in previous years, but none of these have been specifically typed according to the report of the Bureau. A clinical diagnosis only of the disease has been made in nine states, viz., Arkansas, Kentucky, Maine, Mississippi, Missouri, Oregon, Rhode Island, Washington, and Wyoming. The clinical diagnosis has been substantiated by histopathological examinations of Arizona, Connecticut, Michigan, New Mexico, and Oklahoma cases.

It is very important when an outbreak occurs in a new territory that the actual demonstration of the existence of the type of virus should be determined. While clinical diagnosis and a histopathological examination of the brain may be accurate enough for the needs of the practicing veterinarians and owners of horses in territories where the type of the disease has been positively determined, to control the treatment of the disease, in view of the fact that we know positively there are two distinct types of virus, we should have knowledge of the type of the causative virus that is producing the outbreak. The United States is but one of several countries in which outbreaks of the disease have occurred simultaneously involved in severe epizootics of infectious equine encephalomyelitis. The provinces of Saskatchewan, Manitoba, and Ontario, in Canada, have experienced more or less severe epizootic outbreaks. Several South American countries, Argentina, Brazil, Peru, Chile and Venezuela have also suffered from this disease as well as Russia, Japan and India. In 1936, Colonel Kelser of the United States Army reported recovery of the eastern type virus from a horse in Panama. This animal had been shipped from Nebraska some years previous to contracting the disease.

The causative virus in Argentina and Peru is reported to be immunologically indistinguishable from the western type of this country. Howitt's immunological studies in guinea pigs also differentiated the Russian type from either the eastern or western North American type. Howitt has concluded that both American viruses are distinct from Borna disease that is responsible for outbreaks in Europe.

In the December 2, 1938 issue of *Science,* Doctors Beck and Wycoff, Pearl River, New York, have an article entitled "Venezuelan Equine Encephalomyelitis." They state a severe epidemic of equine encephalomyelitis occurred this year in the United States and Canada and that a similar disease has now broken out in northern South America. They received brains of animals dying of this disease from Venezuela. Examination disclosed that the virus is similar and the symptoms resemble those of eastern encephalomyelitis but that the strain is immunologically different from either the eastern or the western virus that are present in North America. They state, however, that their investigation is not sufficient to settle this question and suggest that there may exist a relationship between our eastern strain of virus and the Venezuelan strain.

Further studies and investigations of the disease in laboratories of this country have disclosed that in addition to the horse, man, guinea pig, rats, mice, rabbit, monkey, pigeon, cat, dog, goat, duck, goose, hawk, vulture, stork, ground squirrel, turkey and guinea fowls are susceptible to inoculations with the western virus. The calf, sheep, ring-necked pheasant, quail, pig and European hedgehog are susceptible to inoculations with the eastern type of virus.

Drs. Shahan, Giltner and Schoening report that during October, 1938, a disease amongst wild duck in the state of Montana occurred where sleeping sickness of horses was prevalent at the time. The descriptions of the symptoms were suggestive of encephalomyelitis which they have often seen in experimentally inoculated birds. They received a few of the dead birds, examined their brains but they did not succeed in disclosing the virus, but their pathological studies of the brain revealed alterations suggestive of virus disease, the disease terminated rapidly and they were unable to obtain further specimens for examination. They state that the pathological findings of the examination of the brain were also suggestive of encephalomyelitis and that a study of this disease should be followed up when other outbreaks appear. The tick has been disclosed as capable of transmitting artificial infection from the guinea pig to the ground squirrel or gopher.

Investigations have shown that the virus circulates in the blood of a horse only during the first stages of the disease and may provide the infection for the spread of the disease, however, all studies to date have failed to show that the horse is the carrier. Large numbers of horses are shipped from the western to the eastern markets and yet the western type of the disease has not been transmitted and does not occur in the east. Antibodies have been recovered in the blood of horses that have recovered from both types of the disease. Studies have disclosed that mosquitoes and possibly other anthropods must be considered as incubators and potential carriers of the infection, however, to date studies have failed to disclose infection in mosquitoes or other blood-sucking insects under field conditions.

Dr. Ten Broeck in a talk on Infectious Equine Encephalomyelitis at a conference in Philadelphia this month stated he has found antibodies of the disease in farm fowls such as chickens and turkeys, in territory where outbreaks appeared in horses, that the disease has occurred in nature in ring-necked pheasants and pigeons and that the outbreaks occur in horses simultaneously at points which are considerably distant from each other. He further stated that as a result of their findings there is a possibility that wild birds are the disseminators of this disease. He further stated that he is of the opinion the eastern type of the disease only occurs in the salt water and marsh regions along the Atlantic seaboard.

Further laboratory studies have disclosed that there are eight species of mosquitoes that can carry the infec-

tion. Dr. Wm. A. Riley, chief, division of entomology, University of Minnesota, in a paper presented to the Minnesota Sanitary Conference November 4, 1938, states: "To date we have proof that at least eight species of Aedine mosquitoes are able to take up, incubate and convey, under laboratory conditions, the virus of equine encephalomyelitis. Of the eight species listed, Aedes vexans, Aedes dorsalis and Aedes magromaculis occur commonly in Minnesota. Overwhelmingly dominant in most parts of the state is Aedes vexans, a marsh-breeding species which is noted for its migratory habits. Aedes vexans deposits its eggs in low-lying ground where they may lie dormant not only for the remainder of the year but even for several years, until heavy rains create temporary pools which persist until the development cycle is completed. In warm weather this period may be as brief as four or five days. On emergence, the adults readily migrate for a distance of 15 miles or more."

During the past summer, investigations have disclosed that infectious equine encephalomyelitis has occurred in nature in the ring-necked pheasant and also in pigeons. An article entitled "The Occurrence in Nature of Equine Encephalomyelitis in the Ring-Necked Pheasant" by Tyzzer, Sellards and Bennett of the Department of Comparative Pathology, Harvard University was published in the November 25 issue of *Science*. They report that three pheasants were received for diagnosis on October 6, 1938 from a locality in Connecticut. These birds had been on range and were found in a partially paralyzed condition and died before being shipped. The person who sent the birds reported that he had found dead wild birds as well as pheasants following the hurricane of September 21. The examinations of the brains disclosed no gross lesions with the exception that the brain was soft. This was attributed to postmortem change, the birds having been in transit for three days. White mice were inoculated intracerebrally from the brains. All of the mice were dead on the fourth day. A fourth pheasant was found sick in the same region and the laboratory received the carcass on October 18. Mice were inoculated and died in four to five days. This strain was carried through a second passage in the mice. Serum of a rabbit that has been immune to eastern equine encephalomyelitis gave complete protection to mice against 100,000 minimal infective doses of the pheasant strain. Tests were made of the susceptibility of other birds to the pheasant's virus, and they were successful in transmitting the disease to quail and Rhode Island Red chicks. Experiments disclose the susceptibility of many birds to certain strains of encephalomyelitis; notably the pigeon, a species of vulture, the stork, duck, goose, European blackbird and the common harrier of Europe. They make the following summary that is very interesting: "The recognition of a series of cases of equine encephalomyelitis in pheasants adds valuable information concerning the distribution of this disease, and the designation 'equine' *becomes an unfortunate misnomer*. Indeed, it may be seriously questioned whether the horse or other domestic animals play any essential role in assuring the perpetuation of this disease. The present demonstration of the natural occurrence of the infection in game birds and the experimental evidence obtained by Remlinger and Bailly of the susceptibility of migratory birds to certain strains of encephalomyelitis suggest an easy mode for the wide distribution of this virus. A search for spontaneous infection in migratory birds is indicated. Extensive surveys will be required in order to know just how widely the infection is spread in nature. It may be only under accidental circumstances or when the infection rises to a certain level that it overflows and becomes a serious problem as regards the horse and even the human being."

"A Fatal Disease of Pigeons Caused by the Virus of the Eastern Variety of Equine Encephalomyelitis" is reported in the December 9 issue of *Science* by Fothergill and Dingle of the Harvard Medical School. They report that as a part of their investigation of the human disease, during the recent epidemic of equine encephalomyelitis in Massachusetts, it became of importance to consider the possibility of other host reservoirs of the virus. A number of breeders of pigeons residing in the area where the horse disease existed, reported they had suffered unusual losses in their special breeding stock and also of the common domestic pigeon, the species that is so numerous in our cities. On September 20 they received a dead pigeon from one of the breeders whose residence is adjacent to a farm on which two horses had died. The virus of the eastern variety of encephalomyelitis was recovered from the brain of the pigeon which had spontaneously contracted the disease.

HUMAN INFECTION

Investigations in the past few months have positively disclosed that certain types of encephalitis in man are due to the virus that produces sleeping sickness in horses. The probability of human infection with the equine virus was suggested by Dr. Karl Meyer of California when in 1932 clinical cases of encephalitis in men who had associated with sick animals, was reported. Later, prior to actual demonstration of the virus in man, the presence of substances in the blood of recovered cases of encephalitis which were capable of neutralizing the western type of encephalomyelitis virus, were found by Eklund and Blumstein in Minnesota. Conclusive evidence of the relation between equine encephalomyelitis of the western type and human encephalitis was obtained this year in California by Beatrice Howitt of California.

Drs. Eklund and Blumstein of the Minnesota State Board of Health Laboratory in the *Journal of the American Medical Association* issue of November, 1938, report that in the last week of August and first two weeks of September, 1937, six cases of human encephalitis were reported in a county in northwestern Minnesota. All of these cases were farmers, five of whom had had contact with sick horses, the sixth case had had no contact with sick horses but had run a truck in North Dakota not far from the Minnesota border. All six cases were in men from 22 to 51 years of age; two of them died after an illness of four or five days. In

three cases an acute illness lasted a week. In the sixth case an acute illness lasted three weeks. An autopsy was performed on one of the men who had died. In January 1938 blood was collected from three of the patients who had recovered and the serum forwarded to Dr. Carl Ten Broeck of the Rockefeller Institute for Medical Research. On April 21, 1938, Dr. Ten Broeck reported they had neutralized the western strain of equine encephalomyelitis by the serum of one of the patients. The blood was again collected from this patient in May and neutralization was again demonstrated by Dr. Ten Broeck. They reported that "during the latter part of August and early September, 1938, attacks of what appeared to be a similar disease occurred in Minnesota. Most of these patients had had no contact with horses; the majority lived on farms or in small towns. Blood samples had been collected for identification of the virus."

In the November 11, 1938 issue of *Science,* Beatrice Howitt of the Hooper Foundation of the University of California reports the recovery of the virus of the western strain of equine encephalomyelitis from the brain of a 20 months' old boy who had died in the Fresno County Hospital, Fresno, California. The child contracted the disease on August 25th and died five days later. The virus was transmitted to Swiss mice, from the mice into monkeys, guinea pigs, young rabbits and rats, causing them all to die of the disease. The virus neutralized hyper-immune serum of the western type of equine encephalomyelitis but not those of the eastern type, nor was there any neutralization with the immune serums of the St. Louis type of human encephalitis. She states: "It is interesting that the virus of equine encephalomyelitis should have been found in man almost coincidentally in two widely separated portions of the United States," referring to the Massachusetts outbreak due to the eastern type of virus. She further states "the virus in man due to the western type and the virus in man due to the eastern type are serologically and immunologically distinct from each other."

In the September 30, 1938, issue of *Science* Drs. Webster and Wright of the Rockefeller Institute for Medical Research reported the recovery of equine encephalomyelitis virus from the brain tissue of human cases of encephalitis in Massachusetts. Later in August and early in September 1938 an outbreak of eastern equine encephalomyelitis which was unprecedented, appeared in southeastern Massachusetts. This was accompanied by fatal cases in children nearby. Fothergill, Dingle, Farber and Connerly report the isolation of the eastern encephalomyelitis virus from one of these fatal human cases and the authors confirmed the results obtained by these men and described positive findings in four additional cases. Brain tissues from seven cases were sent to them for study by Drs. Pape and Feemster of the Massachusetts State Department of Health, and of these seven, five yielded the eastern encephalomyelitis virus. Specific neutralization tests were conducted on the four strains of virus with hyper-immune encephalomyelitis rabbit serum. The immune serum showed a protective effect, thus completing the identification of the known virus strains as the eastern equine encephalomyelitis. Western equine encephalomyelitis immune serum did not immunize the virus. They further state: "This is the first instance in which the horse virus has been definitely implicated as a cause of encephalitis in man."

In the October 1938 issue of *Science* there is an article by Drs. Schoening, Giltner, and Shahan, Pathological Division, Bureau of Animal Industry, entitled "Equine Encephalomyelitis Produced by Inoculation of Human Encephalitis Virus." They used the virus obtained from children who had died of encephalitis in Massachusetts and that Dr. Fothergill had sent to Col. Kelser of the United States Army. Three horses were inoculated, one of them a normal animal, one the eastern type immune and the other the western type immune animal. They were inoculated intracerebrally. On the day following the inoculation the control horse had a temperature and on the day following developed typical symptoms of encephalomyelitis and died. The horse that was immune to the western type developed the disease and died. The eastern immune animal remained normal. They made the following conclusion: "The addition of man to the list of species susceptible to equine encephalomyelitis virus again brings to the fore the problems of epizootiology in connection with the equine disease and justifies further investigation and study of the role which the many other known susceptible species might have in the spread of the disease amongst horses, as well as to or from the human family."

In the November 5th issue of the *Journal of the American Medical Association* Drs. Wesselhoeft, Smith and Branch of the Haynes Memorial Hospital, Boston, report eight fatal cases of encephalitis in an area where the eastern strain of equine encephalomyelitis in Massachusetts involved more than 200 horses during the same period and where mosquitoes were unusually prevalent. In four of the human cases the virus of the eastern strain was recovered from the brain. They state that "the high mortality rate among the horses has been parallel in these human cases. Furthermore, it is of epidemiological interest that the peak of the human cases of encephalitis in this area appears to have coincided with the peak of the epidemic in the horses. None of our patients came in contact with a horse, but all had been living within the area where the horses had been stricken."

Dr. Riordan, state veterinarian of Massachusetts, at the meeting of the United States Live Stock Sanitary Association in Chicago on December 2nd, stated that the outbreak of encephalomyelitis this summer in the southeastern section of Massachusetts was reported in two counties with a horse population of 4,000 of which 164 died. There were 103 more cases of encephalomyelitis reported in other districts of the state, making a total of 267 cases reported throughout the state this summer. He further stated there were probably a total of 400 cases in the state and that 98 per cent died.

PREVENTIVE VACCINATION

Definite advances have been made as a result of the laboratory studies in the establishment of immunity in

horses by vaccine. A new type of vaccine known as the "chick embryo" vaccine which was made from the chick embryo and developed by Beard, Finkelstein, Sealey and Wyckoff. Higbie and Howitt were the first to infect chick embryos in the laboratory with equine encephalomyelitis virus. In June 1938, this vaccine was licensed by the Federal Bureau of Animal Industry and was placed on the market by licensed commercial laboratories and sold to veterinarians. It has been extensively used in the field throughout the country since that time. The chick vaccine is prepared from 9- to 12-day chick embryos that are inoculated with the virus of encephalomyelitis present in the brains of horses that die from the disease. The virus is filtered thus ridding it of all bacteria. In its pure form it is inoculated through the egg shell. By cracking the egg with a hypodermic needle the virus is deposited on the membranes surrounding the chick embryo. The virus multiplies very rapidly in this embryo and destroys it in from 18 to 24 hours. The laboratory workers report that a very large amount of virus is found in the embryo, many more times than is found in the brains of animals artificially inoculated. The chick embryos are taken out of the shell under laboratory conditions, subjected to a 0.4 per cent solution of formalin which destroys the virus thus producing a vaccine in which no active virus is present.

Doctors Shahan, Giltner and Schoening state that prior to the treatment with formalin there is a tremendous amount of virus in the embryo and it has been estimated in some cases there are ten million times more virus in the chick embryo than in the horse's brain. These men report that in their laboratory at the pathological division of the Bureau of Animal Industry they have spent a number of months studying and working with this chick embryo vaccine contemporarily with other laboratories. They state that while there are certain unsolved technicalities to be considered, there is indication as to the potency of a properly prepared chick vaccine. "Horses as well as guinea pigs develop an immunity of a high degree through the use of this vaccine, even horses resisting a most severe exposure, that of direct intra-cerebral inoculation." Dr. Schoening, in his address in December to the Horse and Mule Association of America, stated that the immunity produced by the chick vaccine both in laboratory animals and horses has been outstanding; "animals treated with the chick vaccine can withstand very severe doses of experimental massive injection. A recent test conducted by the Bureau of Animal Industry on horses indicated a high degree of immunity in the animals six months after vaccination with the chick vaccine. The test has just recently been completed. Six months ago we immunized three horses —this was a commercial vaccine, by the way, a commercial chick vaccine—two injections seven days apart were administered. Two weeks ago these animals were exposed to the virus of the disease by direct inoculation into the brain, which is the most severe method of exposure possible. At the same time three normal horses which had not been vaccinated were inoculated with the same material into the brain. The result of this experiment was that the three normal horses promptly showed a rise of temperature, developed all of the symptoms of encephalomyelitis within four days, became prostrated and died, whereas the vaccinated horses showed no rise in temperature and remained perfectly normal."

Dr. Schoening further stated that this experiment has a considerable practical application and "it indicates that an animal, as a result of vaccination, may remain resistant for at least six months time. This is a considerable increase over the old brain tissue vaccine. That was one of the disadvantages of that product. It would produce some immunity, but the immunity was not as long lived as it was thought desirable." He stated that their laboratory now have animals on test which they will expose "perhaps three months later, which will be nine months after they have been vaccinated or possibly a year, and we may get further information to indicate that protection may be afforded beyond the six months period. But a six months period would be ample from a practical standpoint to protect animals during the time of the season when the insects would be prevalent." Shahan, Giltner and Schoening report as a result of some months work in the Bureau Laboratory that "immunization against eastern type infection appears more difficult of accomplishment than that against western type. While one dose of as small an amount of vaccine as 0.5 cc. frequently if not generally induces immunity against intra-cerebral exposure of guinea pigs with western virus, two doses at intervals of some days is usually required to effect immunization against eastern virus." Dr. Schoening states that "a large number of horses were subjected to vaccination procedures, both before and during this year's epizootic. Data now available indicates that about 2,000 horses vaccinated with the original formolized brain tissue vaccine two weeks before the outbreak, less than 1 per cent developed the disease. Of about the same number of horses vaccinated at the same time with the new formolized chick embryo tissue vaccine, only about 0.1 per cent contracted sleeping sickness. Again, of about 6,000 horses vaccinated with the brain tissue vaccine during the epizootic, about 1.5 per cent developed the disease; while of over 30,000 horses vaccinated at the same time with the new chick vaccine, less than 0.5 per cent developed the disease. These figures correctly indicate the value of vaccination, both before and during an outbreak, and the superiority of the new chick vaccine over the old brain tissue vaccine. However, best results from vaccination can be expected when animals are vaccinated several weeks in advance of the time when the disease might be expected to appear." He further states: "We have found that the new vaccine commercially prepared gave adequate protection in laboratory animals against all strains of virus recovered from this year's outbreak. These strains included both eastern and western type from Florida, North Carolina, Massachusetts, Illinois, Minnesota, and Kansas.

Chick embryo vaccine made from western strain of virus immunizes only for the western type of disease. Eastern chick embryo vaccines immunize only against eastern type of disease. To date no chick embryo vaccine has been made that will protect against both eastern and western type of disease. Dr. Schoening states

that vaccination can be performed in a horse, however, with both the eastern and western strain vaccines at the same time. The laboratory workers of the Bureau of Animal Industry report that as a result of their work during the past summer with the chick embryo vaccine they find "exposure of the vaccine to high temperatures such as prevail during the summer months lessens the antigenecity of the vaccine. Light may also be deleterious. Even exposure to warm temperatures of 75° to 80° Fahrenheit in the dark results in a gradual lessening of potency." For these reasons it is very necessary that the chick vaccine should be stored under refrigeration until actually used.

PREVENTION

The history of outbreaks of sleeping sickness, particularly that of the western virus, when it appears in a territory is that it reappears in the same territory the following season, and extends to new territory and the number of cases increase until the outbreak reaches a peak, and the number of cases decrease in the area the following season. Investigators to date have not determined how or where or in what animals or fowls the infection or the virus is harbored from one season to the next. The disease in Minnesota apparently reached its peak in the summer of 1937. The number of cases materially decreased in the outbreak in 1938, particularly in the sections of the state where it was so general in the season of 1937. As a result of the knowledge we now have of the method of spread of the disease and the immunity that can be obtained with the new chick embryo tissue vaccine, we are better prepared than ever to prevent the spread of the disease when it appears in a territory and to materially reduce losses in the horses.

It is very necessary that horse owners in this state where we know the virus is located, take all precautions to protect the animals against insects for a period of six months beginning the middle of May or the first of June. This is very important as a method of protecting the animals against the virus. Horses and mules should be kept in screened stables at night until after the appearance of the first heavy frost. While working they should be covered with muslin flynets and the exposed parts should be sprayed two or three times a day with a good fly repellent spray. The Bureau of Animal Industry formula for a home-made spray is effective. Illinois Experimental Station reports good results in the use of a preparation developed by them to protect pastured animals from mosquitoes and flies. It should be applied lightly with a brush all over the body, brushing with the hair and not against it. The application of this material once a week is sufficient as a rule unless the mosquitoes are very numerous, when it should be applied twice a week. It should never be used on work horses as it may produce irritation of the skin. The formula for this preparation is "fish oil (cold pressed fish oil best) 100 parts, oil of tar (from pine trees) 50 parts, crude carbolic acid 1 part."

With our knowledge of the new chick embryo tissue vaccine although it is not one hundred per cent effective we have an effective preventive treatment that will protect a horse or mule for a period of six months, if the vaccine is maintained under refrigeration until used and is properly administered. In Minnesota we are not justified in recommending that all horses in the state, or in any particular territory in the state, be vaccinated as a preventive this coming season. It is an economic problem and each horse owner should consult his local veterinarian, taking into consideration his location in the state, and then decide for himself. A number of the veterinarians state they think they have had results when the disease appears in a territory, after they have given only one dose of the chick embryo vaccine. No doubt some immunity is conferred with the one dose but such immunity is not acquired until four or five days after the administration of the one dose and the second dose should be administered in order to produce effective immunity. The best results can be obtained by administering the two doses of the vaccine prior to the appearance of the disease in a neighborhood.

The first symptoms of the disease in a horse are not as a rule recognized. When it appears in a territory all horse owners should examine their horses carefully two or three times a day and when the first symptoms appear they should immediately call their veterinarian and follow out his instructions; with proper treatment, good nursing and care the mortality may be reduced to a minimum.

OUTBREAKS OF THE DISEASE IN MINNESOTA AND SURROUNDING STATES

In the summer of 1938 the number of cases and the losses have been very much less in the states of North and South Dakota and Minnesota. In Iowa, however, there were more cases than in any prior year but the percentage of deaths was relatively reduced. In Wisconsin the disease was more general and extended eastwardly. We received a report from the livestock sanitary authority of Wisconsin, dated January 5, 1939, that reports of 205 practicing veterinarians disclose there were 7,289 cases and 1,538 or 21.1 per cent deaths. They advise 10 per cent should be added to these figures to account for unreported cases. A report from the state of Iowa, dated January 6, 1939, discloses that they have reports from 495 practicing veterinarians of 57,710 cases of which 10,301 or 17.84 per cent died. They state that they expect to receive reports from 115 more veterinarians and these reports will add materially to their cases. On January 5, 1939, the state of North Dakota reported that they do not have the number of cases but that reports from all the counties in the state with the exception of five disclose 2,209 horses died of the disease.

The disease was first reported in Minnesota in 1933. There were a few cases reported in the southwestern part of the state that were clinically diagnosed but the diagnosis was not confirmed by laboratory findings. In 1934 there were 330 cases reported of which 110 or 33⅓ per cent died. In 1935 there were 3,337 cases reported of which 1,244 or 37.2 per cent died. In 1936 there were 112 cases of which 31 or 27.6 per cent died. In 1937 there were 45,275 cases of which 10,120 or 22.35 per cent died. To date we have reports from 257 practicing

veterinarians who experienced the disease in their practices in Minnesota during the past summer. We are satisfied that these reports represent all of the veterinarians who experienced the disease within the state with the exception of five. In the territory in which these five are located, judging from the reports of other veterinarians in the same territory, they experienced very few cases.

In preparing the compilation of the incidence of the disease during the past summer we have included the reports of the 257 veterinarians and the reports received from a few county agents in counties where there are no practicing veterinarians, and also cases to which veterinarians were not called. The compilation discloses that during the outbreak there were a total of 23,686 cases of which 4,979 or 21.02 per cent died. We sent questionnaires to the practicing veterinarians of the state on which to furnish their reports relative to the outbreaks and the results of their experience with the different vaccines that were used within the state prior to and during the outbreak. The compilation of these reports discloses that throughout the state the average number of horses that contracted the disease on each farm where it appeared was one plus. The anti-encephalomyelitis serum was reported used therapeutically on 8,602 horses, the majority of the veterinarians stating that in their experience the serum is of therapeutic value if administered on the first or second day after the first symptoms appear. The formolized brain tissue (2 doses) was administered to 11,498 animals, of which 294 or 2.55 per cent developed encephalomyelitis. 41,596 animals were vaccinated with two doses of the chick embryo tissue vaccine, of which 189 or 0.45 per cent developed the disease. 7,932 animals were vaccinated with the Rosenow sero-vaccine, of which 274 contracted the disease or 3.45 per cent. The number of animals in these areas that were vaccinated with the formolized brain tissue vaccine during the epidemic was 6,882, of which 112 contracted the disease or 1.6 per cent; 31,622 horses in these areas were vaccinated with the chick embryo tissue vaccine (2 doses), of which 104 or 0.32 per cent contracted the disease; and 6,518 horses in these areas were vaccinated with the Rosenow product, of which 100 contracted the disease or 1.5 per cent.

The reports disclose that 57 veterinarians experienced a secondary outbreak of the so-called "X" disease. They reported 173 animals affected, of which 110 or 63.5 per cent died. Of these 173 animals 14 had received the formolized brain tissue vaccine and 61 had received the chick embryo tissue vaccine. The last case reported was on December 11, 1938, but the majority of the cases appeared during the middle or latter part of October.

In our compilation of the outbreak of 1937, for the reason that many of the veterinarians' practices included territory in more than one county and for the further reason that during the outbreak they were so intensively busy, we did not request them to furnish reports of the cases in individual counties and the compilation of the incidence of the disease was compiled in nine districts of the state. In our compilation of the outbreak in 1938 we succeeded in receiving reports of the cases by counties. The incidence of the disease in 1938 was materially less in the territories where it was generally prevalent in 1937, and the majority of the cases during the 1938 outbreak appeared in the districts where it was not generally prevalent in the 1937 outbreak.

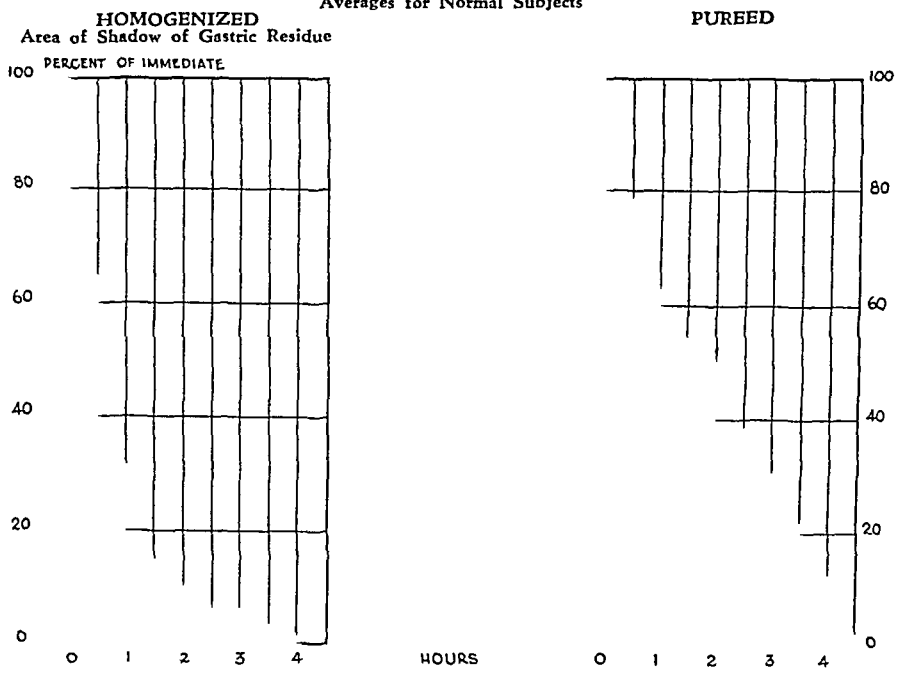
Comparative Energy Expenditures and Time Required for Digestion of Homogenized or Pureed Vegetables in the Human Stomach

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CALDWELL[1] recently reported a combined laboratory and clinical study of the value of homogenized foods as supplements to the milk diet of infants as early as three months. The author observed that in in-vitro digestion tests, starch was digested at a more rapid rate than either that in commercially strained or home strained vegetables. This report suggested the advisability of investigating the advantages and limitations of the use of fruits and vegetables in homogenized form as supplements to the smooth or bland diet for the treatment of patients with functional disturbances of the gastrointestinal tract. The initial step in this investigation was the determination of both the comparative energy expenses and the comparative times required for digestion of homogenized and of pureed vegetables in the stomachs of average normal adults and of ambulatory patients with chronic peptic ulcers, who, according to McLester,[2] require adequate nutrition but at the same time rest, both motor and secretory, for the stomach.

CHART I

Comparative Rates of Digestion in the Stomach of Homogenized and of Pureed Vegetables
Averages for Normal Subjects



EXPERIMENTAL METHOD

In their monograph "Food Ingestion and Energy Transformations," Benedict and Carpenter[3] have presented suggestions concerning methods for studying effects upon basal metabolism (more accurately called "fasting metabolism") of the ingestion of food or drugs. As indices of the energy expenditures for digestion of foods, these authors have determined the total increments in heat production chargeable to the ingestion of the food and have calculated this increment as a percentage fraction of the total fuel value of the food.

The plan of the experiments adopted incorporated all of the suggestions offered by Benedict and Carpenter and in addition, included determinations of the emptying times of the stomach by fluoroscopy and roentgenograms. The subjects reported at the laboratory at 9 a. m., after a fast from all food for 15 hours and rested for two hours before consuming the foods under test. At the beginning of the second hour of this rest period, the subjects emptied their bladders completely by voluntary voiding and drank 300 cc. of tap water. During the last ten minutes of the second hour of the test period, their basal metabolic rates were determined by the open circuit method, using the apparatus described by Bailey.[4] The foods under test were fed to the experimental subjects at approximately body temperature.

The procedure utilized in determinations of gastric evacuation times was identical with that adopted by Van Liere and Sleeth,[5] except for the fact that roentgenograms were made at intervals after ingestion of the foods in addition to fluoroscopic examinations. One ounce of $BaSO_4$ was added to each experimental meal before consumption of the meal. Roentgenograms were made

TABLE 1

Comparative Times and Energy Expenses for Digestion in the Stomach of Either Homogenized or Pureed Vegetables.

Subject	Gastric Evacuation Time (Hours)		Total Increment in Calories Produced During Period of Gastric Digestion	
	Homogenized Vegetables	Vegetables	Homogenized Vegetables	Pureed Vegetables
T. C.	2.2 2.5	4.6 4.0	10.0 9.2	21.1 29.5
C. O.	1.5	3.5	9.4	20.1
L. G.	3.5	4.9	7.3	29.8
Average	2.4	4.2	8.9	25.1

(with the film at a distance of approximately 75 cm. from the source of the X-rays), immediately after consumption of the meals and then at intervals of approximately thirty minutes during the course of gastric digestion of the meals. Fluoroscopic examinations were made at the beginning of the second hour after consumption of the meal and were continued at intervals as long as the gastric contents could be seen with the fluoroscope. The intervals of time after consumption of the meals until all demonstrable remnants of the meal had left the stomach, were taken as the gastric evacuation times.

Throughout the experimental periods, all subjects rested in an invalid's wheel chair, which was placed between the gasometer on one side and the fluoroscope on the other side. The subjects moved from the wheel chairs only to stand erect for the voiding of urine at the end of each hour and for their fluoroscopic examinations or roentgenograms. Determinations of total heat pro-

duction were made during the interval of ten minutes immediately preceding the radiographic examinations. Throughout the experimental periods, the subjects remained awake and in complete muscular repose.

The subjects utilized in these experiments were apparently normal, healthy adults who, in fractional gastric analyses and radiographic studies of gastrointestinal function, showed neither organic nor functional abnormalities in their gastrointestinal tracts. Both T. C. and C. O. have stomachs of average normal motility; L. G. has a "slow stomach." Chemical analyses of blood and urine and repeated determinations of basal metabolic rates indicated no demonstrable disturbances of metabolism in these subjects. The samples of homogenized vegetables utilized in these experiments were taken from a canned mixture of equal parts of carrots, spinach and peas which contained 9.3 per cent of total solids, 2.0 per cent of protein and 5.2 per cent of total carbohydrates (by difference). The strained vegetables were prepared by combining in equal portions by weight, the contents of canned spinach, canned peas and canned diced carrots. This mixture was heated to approximately 60 C. and passed through a "Standard Babies' Siv." Samples of the strained vegetables utilized in these experiments were analysed and the average total solids was 10.9 per cent; average protein content was 2.17 per cent and the average amount of total carbohydrate was 4.63 per cent (by difference).

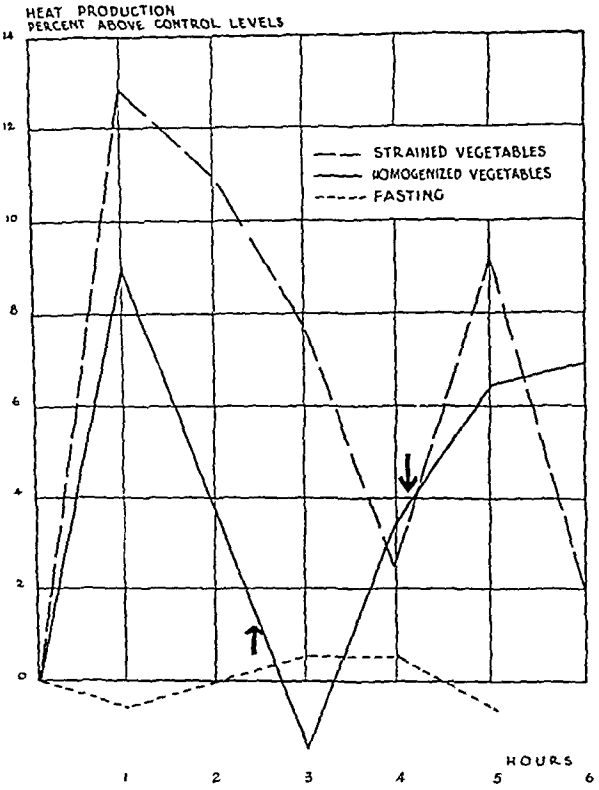
In calculating the total fuel values of the meals, the factor 4.1 was used to determine the caloric value of both protein and carbohydrate. The sum of the calories which could be derived from these two constituents of the vegetables represents the total estimated fuel value of the vegetables. Since the amount of fat in the vegetables (total ether extract) was only 0.2 per cent, fat calories were not included in estimates of the total fuel values of the meals. In all experiments, 300 grams of either homogenized vegetables or strained vegetables were consumed by each of the subjects. The comparative experiments carried out on each subject were made before and after intervals of 48 hours. At the end of the period of the first experiment, the subject received a dose of castor oil to eliminate from the intestinal tract all residua of the barium administered. The second experiment was made on the third day following the first experiment. Before beginning the second experiment, a roentgenogram of the gastrointestinal tract was made to exclude the possibility of barium having been retained from the previous experiment.

Experimental Results

Comparative gastric evacuation times after the meals are reported in table 1. Two series of tests were made on T. C.; in the first series, the emptying time of the stomach was 2.2 hours after the meal of homogenized vegetables and 4.6 hours after the meal of strained vegetables and in the second series, after the meal of homogenized vegetables, the gastric emptying time was between 2 and 2.5 hours, but after the meal of strained vegetables, it was 4 hours.

CHART II

Comparative Rates of Increase in Heat Production and Emptying Times of Stomach After Either Homogenized or Pureed Vegetables. Averages for Three Normal Subjects. ▲ Indicates Evacuation Time of Stomach.

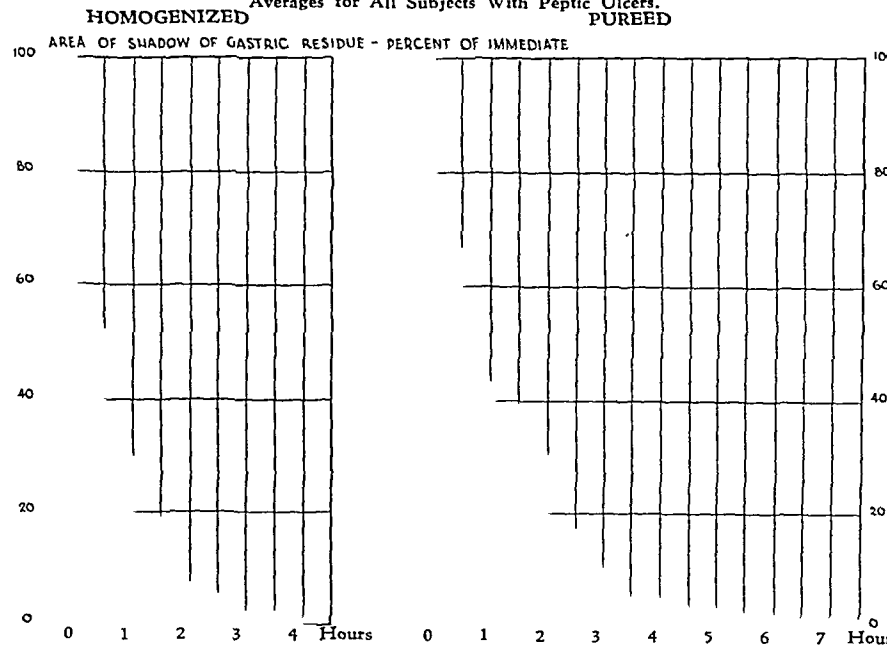


The emptying times of the stomach after the meals of strained vegetables varied from 140 to 233 per cent of the emptying times for the homogenized vegetables. In the four experiments made on three subjects, the average increase in emptying time of the stomach after the strained vegetables, over the time required for gastric digestion of the homogenized vegetables was 86 per cent of the time required for the homogenized vegetables.

As indices of the relative rates of progress of the vegetables through the stomachs of the subjects, the areas of the shadows of the residues of the meals in the stomach were determined with the use of a planimeter and calculated as percentages of the shadows in the roentgenograms made immediately after ingestion of the vegetables. The columns of chart I represent the average rates of emptying of the stomach after meals of homogenized or strained vegetables for four experiments on three normal subjects in terms of the percentage decreases in the areas of the shadows. Obviously, this method of interpretation of the radiographic findings introduces an error in the fact that the anteroposterior depth of the gastric residue is not considered. However, it does conform to the radiologist's estimate of the volume of gastric contents and along with data for the emptying time of the stomach, presents a graphic representation of the progress of the meal through the stomach. At the end of two hours, the area of the shadow of the residue of homogenized vegetables had

CHART III

Comparative Rates of Digestion in the Stomach of Homogenized and of Pureed Vegetables. Averages for All Subjects With Peptic Ulcers.



fallen to less than 10 per cent of the immediate but during this period, the area of the residue of strained vegetables had reached only 48 per cent of the shadow of the meal immediately after consumption. In fact, the average area of the residue of the strained vegetables after four hours is appreciably greater than the residue of the homogenized vegetables at the end of two hours of digestion in the stomach.

Average variations in total heat production from the level of the control hours, are represented by the curves in chart II. In the control experiment (on T. C.) total heat productions were determined before and at intervals of one hour for 4 hours after the consumption of 300 cc. of water at body temperature, and these results are represented by the curve marked "fasting" in the chart. The variations in total heat produced per hour during this experiment, were from —0.5 to +0.4 per cent of the control level. After ingestion of either homogenized or strained vegetables, prompt increases in total heat production were noted, reaching their peaks during the first hour after ingestion of the vegetables and then decline during the subsequent hours.

The positions of the arrows on the curves indicate the average times at which the meals have left the stomach. It is significant to note that the peaks in the curves for increases in total heat production and the major part of the total increase in heat produced above the control levels, were observed during the period intervening between consumption of the vegetables and the time of complete emptying of the stomach.

In the calculation of the energy expense for digestion of the meals, total increments in heat produced above the control levels have been calculated for the intervals required for gastric digestion of the meals, as determined by fluoroscopy and roentgenograms. Data for total increments in heat produced during periods required for gastric digestion of the vegetables are given in table 1. In all experiments, the total increases in heat produced during gastric digestion of the pureed vegetables were greater than those found after the homogenized vegetables. From the curves of chart II, it will be seen that these differences are not due to variations in the maximum heights of the curves but rather to relative lengths of the periods during which the curves are sustained above the control levels. For each of the two forms of vegetables, there is evident some relationship between the duration of extra heat production indicated by chart II and the rate of decline in the size of the residue of the meal in chart I which suggested a dependence of the extra heat produced upon the work being done by the stomach to digest and to evacuate the meal.

During the period in which residues of the strained vegetables could be demonstrated in the stomach, the average total increment in heat was 25.1 calories, that is, 30.2 per cent of the estimated fuel value of the meal. For the homogenized vegetables, the average total increment in heat production was 8.9 calories or 10.1 per cent of their estimated fuel value. These ratios, interpreted according to Benedict and Carpenter, indicate that the energy expenditure for digestion of homogenized vegetables in the stomach of the normal subject is approximately one-third of that required for the strained vegetables.

These studies of the comparative gastric evacuation times for meals of homogenized and strained vegetables were extended to include a group of ambulatory patients who gave histories of chronic peptic ulcers. A group of eight patients, seven men and one woman, were selected

representing one case of gastric ulcer and seven cases of duodenal ulcer. Brief abstracts of their histories are given. Clinic or previous roentgen diagnoses were confirmed by roentgenograms and fluoroscopy and these findings are described briefly in table 2.

Samples of the canned combination of homogenized vegetables were fed as described above for the normal subjects. Pureed vegetables were prepared according to the same procedure as that used for the strained vegetables for the experiments on the normal subjects except in one case, M. G., in which the mixture of the three canned vegetables was pureed by macerating with a fork. This sample was not strained and no fiber was discarded. Determinations of the comparative gastric evacuation times were made as described above in the experiments on the normal subjects. Results of the two series of radiographic studies of each subject are summarized in table 2 and chart III.

TABLE 2

Comparative Gastric Evacuation Times Shown by Cases of Peptic Ulcer for Either Homogenized or Pureed Vegetables.

Subject	Gastric Evacuation Times (Hours)		Analyses of Pureed Vegetables	
	Homogenized Vegetables	Pureed Vegetables	Total Solids (Perc.)	Crude Fiber (Perc.)
L. S.	4.5	9.0+	11.9	0.69
F. R.	2.5	4.5	12.7	1.41
M. G.	3.0	4.0	12.9	1.39
A. S.	3.0	3.0	11.9	0.79
M. M.	3.0	3.0	12.8	1.40
R. H.	5.5	8.0+	12.5	1.41
A. B.	3.5	4.5	12.0	1.39
G. G.	3.0	4.0	12.0	1.39
Average	3.5±0.7	5.0±1.7		

The homogenized vegetables had a fiber content of 0.60 per cent but the amounts of fiber in the strained vegetables varied from 0.69 to 1.41 per cent. Apparently straining the vegetables had a variable effect upon the fiber content of the samples; five had fiber contents equivalent to that of the unstrained sample.

One patient, L. S., had a pyloric stenosis; his gastric evacuation time for the homogenized vegetables was 4.5 hours but even after 9.0 hours a residue of the strained vegetables was demonstrable in his stomach, although the fiber content of the strained vegetables was only 15 per cent higher than that of the homogenized vegetables. R. H. showed an atony and dilatation of his stomach; his gastric emptying time for the homogenized vegetables although unusually long, i. e., 5.5 hours, was 68 per cent of that for the strained vegetables. A retarded gastric motility was found in F. R.; his gastric evacuation time for the homogenized vegetables was 2.5 hours and for the strained vegetables 4.5 hours. A. S. and M. M., exhibited no difference between the emptying times of the stomach after meals of either homogenized or strained vegetables.

The comparative rates of digestion of homogenized and of strained vegetables in the stomachs of these cases with histories of peptic ulcers have been summarized in chart III. Only traces of residues of the meals of homogenized vegetables, i. e., 2 per cent of the area of the shadow immediately after their consumption were visible at the end of 3 hours. However, after the strained or pureed vegetables, the average length of time during which remnants of the meals were demonstrable in the stomach was 6 hours. The average gastric evacuation time for the homogenized vegetables was 3.5 hours and for the strained and pureed vegetables more than 5.0 hours.

ABSTRACTS OF CLINICAL HISTORIES OF PATIENTS WITH PEPTIC ULCERS

L. S. — M., Age 50 — Has complained of abdominal pain two to three hours after meals, relieved by food and alkalies, duration about two years; has lost 20 pounds since onset of symptoms; roentgen diagnosis: chronic duodenal ulcer with pyloric stenosis

F. R. — M., Age 37 — Has complained of stomach trouble for fifteen years, severe pain after meals, vomiting and hematemesis; gastroenterostomy was performed thirteen months previously; roentgen diagnosis: chronic duodenal ulcer, gastrojejunostomy and retarded gastric motility.

M. G. — M., Age 27 — Has complained of stomach trouble for two years, epigastric pain about one hour after meals, relieved by food and alkalies; roentgen diagnosis: simple duodenal ulcer, no evidence of pyloric stenosis

A. S. — F., Age 42 — Has complained of stomach trouble for three years, epigastric pain about two hours after meals, relieved by food and alkalies; roentgen diagnosis: simple duodenal ulcer, no evidence of pyloric stenosis

M. M. — M., Age 37 — Has complained of stomach trouble for two years with seasonal exacerbations, pain localized midway between umbilicus and xyphoid process about one hour after meals, relieved by alkalies; roentgen diagnosis: simple duodenal ulcer, no evidence of pyloric stenosis.

R. H. — M., Age 50 — Has complained of stomach trouble for many years, with an acute exacerbation within past several months, pain in left hypochondrium localized just at the costal margin, vomiting, poor appetite and loss in weight; roentgen diagnosis: chronic gastric ulcer, callous and penetrating in type with a possibility of a secondary malignant change, an atonic stomach with moderate gastrectasia

A. B. — M., Age 49 — Has complained of stomach trouble for five years, epigastric pain two to three hours after meals, relieved by food; has been on an ulcer diet for several months; roentgen diagnosis: chronic duodenal ulcer, no evidence of pyloric stenosis

G. G. — M., Age 34 — Operated nine years previously for perforated peptic ulcer; at present has mild gastric symptoms, pain two to three hours after meals, relieved by food; roentgen diagnosis: chronic duodenal ulcer, no evidence of pyloric stenosis

SUMMARY

The objectives in the experiments described in this report were (a) to determine the comparative gastric evacuation times after meals of either homogenized or strained vegetables and (b) to estimate the comparative energy expenses for their digestion. Observations are reported on three average normal adults and eight adults with histories of chronic peptic ulcers, confirmed by radiographic examinations before determinations of rates of digestion of vegetables were made.

In four comparative tests made on three normal subjects, the average emptying time of the stomach after

meals of homogenized vegetables was 43 per cent less than the average emptying time of the stomach after meals of strained vegetables.

As indices of the energy expenses for digestion of the meals in the stomach, the total increments in heat production, for the periods of gastric digestion, chargeable to ingestion of the vegetables, were calculated as percentage fractions of the estimated total fuel values of the meals. The average energy expense for gastric digestion of the homogenized vegetables, determined in four experiments, was 10 per cent of the fuel value of the vegetables and for digestion of the strained vegetables, determined in four experiments, it was 30 per cent of their fuel values.

Gastric evacuation times for homogenized vegetables were less than those for strained or pureed vegetables in six of the eight cases of chronic peptic ulcer. The greatest differences in gastric emptying times for the two forms of vegetables were observed in cases showing pyloric stenosis or retarded gastric motility. The average gastric evacuation time for 300 gm. of homogenized vegetables was 3.5 hours and for 300 gm. of pureed vegetables more than 5.0 hours.

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NOTE: The authors desire to acknowledge their indebtedness to Dr. Seymour Fiske and Dr. David H. Reisner of New York City who made the roentgen and fluoroscopic examinations of normal subjects and ulcer patients.

The homogenized foods referred to were furnished by Libby, McNeill and Libby, Chicago, Illinois.

The Adsorptive Power of Animal Charcoal for the Toxic Principle of Tuberculin*

Preliminary Report

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TAKING into consideration the recent work showing the ability of finely divided carbon to apparently neutralize the toxic properties of the gonococcus in either a systemic or a localized infection as shown following its intravenous injection, it was suggested that we attempt to apply this physical property of carbon to either the tubercle bacillus or to its toxin. To apply this to the human strain of the organism, we have begun by attempting to detoxify or to adsorb the toxic molecules of the standard preparation of Old Tuberculin.

Our first preparation was made by adding one gram of finely divided and activated (wood) charcoal to five cubic centimeters of O. T. in the dilution of one to a thousand. The solution was shaken for ten minutes and then filtered. The first filtrate contained too much carbon to be used in the Mantoux test for fear of permanent discoloration of the skin. The suspension was therefore centrifuged for two hours and then filtered twice through No. 2 Whatman filter paper. The remaining filtrate was practically colorless although the volume was reduced to three-tenths of a cubic centimeter. This preparation was autoclaved along with two cubic centimeters of standard one to a thousand O. T. Two patients who had previously reacted strongly to the Mantoux test but who had no active childhood or adult type of lesion were chosen as subjects. In each of their right arms one-tenth of a cubic centimeter of the preparation was injected intradermally, the left arms receiving the standard Mantoux injection (the one to one thousand O. T. which had been autoclaved as a control). The results were read in forty-eight hours and all four arms gave responses varying from three plus to four plus. The results of the first experiment were, therefore, discouraging.

A second preparation was then made by adding one gram of wood charcoal and one gram of animal (bone) charcoal to five cubic centimeters of one to a thousand O. T. This solution was shaken for ten minutes and then filtered through No. 2 Whatman filter paper. The filtrate this time was colorless and was sterilized as before with a control. One-tenth of a cubic centimeter of this preparation was injected into the flexor surfaces of the right arms of two more of the same type of patients, the left arms again serving as the controls. In forty-eight hours the results were read and in both cases the right arms showed no response to the preparation while the left arms gave a plus three and a plus four response, respectively.

A third preparation was made by adding one gram of the animal charcoal alone to seven cubic centimeters of the standard one to a thousand O. T. This suspension was shaken for two minutes and then filtered

*Original article submitted July 15, 1938.

through a plain untreated filterpaper to rule out the possibility of any reaction of the chemically treated Whatman No. 2 paper. The first filtrate was absolutely colorless and measured approximately four cubic centimeters due to loss by absorption. This was sterilized as before with a control and injections made into the right arms of ten patients, the left arms again serving as controls. With one possible exception all of the right arms gave negative results after forty-eight hours while the controls gave responses varying from three plus to four plus. The one exception gave a very small discolored area (approximately one centimeter) without edema which may have been due to capillary trauma. All patients were examined twenty-four hours later for delayed responses and found to be negative (right forearms).

The results of this series of cases demonstrated conclusively to our minds that animal charcoal adsorbs the toxic principle of tuberculin. We have, therefore, decided to continue this line of work by attempting to introduce a carbon suspension into a series of animals. First we shall determine how we can place it in the mediastinal lymph glands and then, by infecting another group of animals with tuberculosis, we shall attempt to adsorb the toxin released from the parenchymatous lesion by the introduction of charcoal into the regional glands. If this is successful, another form of rest therapy may be made available to release the body as a whole from the continued toxic effects of the tuberculosis toxin.

We wish to express our gratitude to the following for their efforts in advisory and in practical capacities: Samuel B. English, M.D., Superintendent of the New Jersey State Sanatorium for Tuberculous Diseases at Glen Gardner; Homer P. Arena, D.P.; and Howard Cline, laboratory technician.

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The Influence of Prolonged Administration of High Dosages of Vitamin D Upon the Serum Calcium of Adults*

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FROM time to time, there have appeared in the literature discussions on the alleged toxic influence of large doses of vitamin D in adults. In support of this contention, most authors regard an increase in serum calcium as the basis for potential harm to the organism, and use the degree of serum calcium elevation as an index of toxicity. Following the publication of Dreyer and Reed,[1] the author treated several hundred arthritic patients with high dosages of a special vitamin D.* Uniformly good results were obtained; in many cases, patients were restored to economic usefulness. In fact, few if any patients failed to respond to some degree, a finding concurred in by both Livingston[2] and Steck.[3] Early in this clinical effort,[4,5] the blood calcium level was determined in all patients prior to and during active therapy. The dosage of vitamin D ranged from 150,000 to 500,000 U. S. P. units daily. We were unable to demonstrate alteration in the serum calcium. In fact, the only evidence of "toxicity" discernible was temporary urinary frequency and nausea which quickly disappeared upon decrease of dosage. It was found, furthermore, that maximum benefit was obtained when the dosage was raised to just below the point where the aforementioned symptoms appeared.

In 1938 Abrams and Bauer[6] published a report covering their observations on the effect of massive doses of vitamin D on 18 patients with rheumatoid arthritis. The vitamin preparation used by them was Drisdol in propylene glycol or in sesame oil. In sixteen of the eighteen patients, hypercalcemia developed at some time during the period of vitamin D therapy. In seven cases, fasting serum calcium values varying from 11.2 to 16 mg. per 100 cubic centimeters persisted for weeks after the dosage of vitamin D was reduced or the drug discontinued. These investigators were unable to exceed a dose of 200,000 U. S. P. units daily of the crystalline vitamin D in propylene glycol (administered in milk) without encountering toxic symptoms. Although some patients tolerated larger doses of the crystalline vitamin D in sesame oil, there was not a single instance where a daily dose of 300,000 U. S. P. units could be exceeded without encountering serious toxic symptoms or hypercalcemia. The toxic symptoms consisted of pain, diarrhea, headache, drowsiness, polyuria, polydipsia, and nocturia; they as well as the hypercalcemia in some of the cases persisted for several weeks following discontinuance of the vitamin D therapy.

Among the conclusions drawn by Abrams and Bauer are: "Subjective improvement lasting throughout the period of therapy was observed in eight cases. In only three instances was this accompanied by objective improvement and in only one was it marked. Such improvement was short lived when therapy was discontinued. Our results indicate that the administration of massive doses of vitamin D in rheumatoid arthritis is

*The vitamin D preparation (Ertron) used in this study was furnished by Nutrition Research Laboratories.

TABLE 1

Case No.	Age	Sex	Characterization of Arthritis			Previous Treatment	Vitamin D Therapy		Daily Dose of Vitamin D (U S P Units)		Symptoms of Intolerance	Hypercalcemia	Observed Effects		Weight		End Results and Comments
			Duration	Extent of Involvement	Activity of Disease		Began	Discontinued	Min	Max			Subjective Changes	Objective Changes	Before Taking Vitamin D	In May 1939	
1	71	F	4 years (1933)	Atrophic: left hip, osteoporosis of bones	Subacute partial disability	Salicylates, acetylsalicylic acid, intravenous and subcutaneous injections, diathermy, fever therapy	Aug 1937	Still under treatment	50,000-300,000		Slight nausea, increased micturition at 300 000 units daily	Not present	Less pain	More freedom of motion in affected hip, greater stability of posture	133 lbs	135 lbs	Now able to walk, slight limp due to shortened left leg caused by fracture of femoral neck, appetite good, sleeps well, treatment being continued
2	38	M	2 years (1935)	Atrophic back, ankles, knees and shoulders	Subacute slight disability	Intravenous and subcutaneous injections	Sept 1937	Still under treatment	50,000-200 000		None	Not present	Disappearance of pain	Complete function of all joints, no swelling	178 lbs	178 lbs	Able to work full time, no recurrence of symptoms
3	39	F	7 years (1930)	Atrophic wrists, elbows, knees, ankles and neck	Acute partial disability	Cod liver oil capsules	Aug 1937	Aug 1938	50,000-200,000		Slight increase in micturition at 200,000 units daily	Not present	Disappearance of pain	Complete function of all joints, good posture, no swelling, return to normal contour	100 lbs	108 lbs	Able to work full time, good appetite sleeps well, no recurrence of symptoms
4	44	M	1 year (1935)	Hypertrophic all joints	Acute marked disability	Cabinet, heat, ultraviolet ray and mineral baths, serum injections	Aug 1936	Still under treatment	50,000 200,000		None	Not present	Disappearance of pain	Complete unction of all joints except right thumb, good posture	165 lbs	169 lbs	Able to work full time, good appetite, sleeps well, treatment being continued
5	35	F	5 years (1931)	Atrophic neck, knees, hands and shoulders	Subacute slight disability	Fever therapy, diathermy, salicylates	Feb 1936	Feb 1937	50 000-200,000		None	Not present	Disappearance of pain	Complete function of all joints, normal posture	96 lbs	115 lbs	Able to work full time, no recurrence of symptoms
6	39	F	1 year (1936)	Hypertrophic knees, hands, hips, elbows shoulders and neck	Acute total disability	Diathermy, ultra-red, ultraviolet, salicylates, vaccine combinations, serum combinations, massage, thyroid plus pituitary extracts	Oct 1937	Still under treatment	50,000-800 000		None	Not present	Occasional slight pain	Good posture, good function of all joints	210 lbs	168 lbs	Able to work full time, good appetite, sleeps well, treatment being continued
8	54	F	14 years (1922)	Atrophic sacro-iliac and cervical regions, shoulders, elbows and knees	Chronic acute, total disability	Acetylsalicylic acid, sodium salicylate, special diets	Oct 1936	May 1937	50,000 600,000		None	Not present	Occasional slight pain	Complete function of all joints, normal posture	105 lbs	148 lbs	Able to work full time giving piano lessons, no return of symptoms
9	38	M	1 year (1936)	Hypertrophic hands wrists, elbows and knees	Subacute slight disability	Sulphur baths, effervescent medicine	Oct 1937	Feb 1938	50 000-300 000		None	Not present	Occasional slight pain	Complete function of all joints normal posture	201 lbs	173 lbs	Able to work full time; no recurrence of symptoms
10	57	F	3 years (1934)	Atrophic. all joints	Acute total disability	Light treatments, massage, salicylates, intravenous and subcutaneous injections (vaccines and serums)	July 1937	Still under treatment	50,000-200,000		Slight dizziness, nausea, increased micturition at 200,000 units daily	Not present	Moderate occasional pain	Fair posture	95 lbs	106 lbs	Able to do some housework, still partially disabled, treatment being continued
11	53	F	13 years (1923)	Atrophic all joints	Chronic acute, total disability	Teeth extracted, physiotherapy, stretching o arms and legs, intravenous serum, colonic irrigations, diathermy, special diets	June 1936	Still under treatment	50 000-700 000		Increased micturition at 700 000 units daily	Not present	Moderate occasional pain	Fair posture	91 lbs	115 lbs	Able to do some housework; all joints have regained function sleeps well, appetite good, could walk but afraid due to mental attitude, treatment being continued
12	56	F	10 years (1927)	Atrophic hands, knuckles of fingers, and ankles	Subacute slight disability	Acetylsalicylic acid	Feb 1937	Aug 1937	50,000-200 000		None	Not present	Moderate occasional pain	Normal posture, complete function of all joints	114 lbs	114 lbs	Able to work full time, in good health
16	43	F	6 years (1931)	Atrophic hands, wrists, elbows, shoulders, knees, ankles, finger joints ankylosed	Chronic acute, total disability	Colonic irrigations, salicylates, steam baths	June 1937	March 1939	50,000-300,000		Dizziness, slight diarrhea, increased micturition at 300,000 units	Not present	Moderate pain	Partial function of all joints except wrists and knees	128 lbs	128 lbs.	Decided improvement in function of joints; still unable to walk, good appetite, sleeps well; treatment being continued
17	44	M	4 years (1933)	Atrophic sacro-iliac joints, eft hip, hands and feet	Subacute slight disability	Salicylates	Feb 1937	Dec 1937	50 000-200,000		None	Not present	Moderate pain	Complete function of all joints, normal posture	150 lbs	155 lbs	Able to work full time, in good health
19	55	F	4 years (1933)	Atrophic thighs, hips, and sacro-iliac joints	Subacute slight disability	Salicylates, acetylsalicylic acid	May 1937	Jan 1938	50,000-200,000		None	Not present	Moderate pain	Complete function of all joints, normal posture	152 lbs	140 lbs	Able to work full time, in fair health
20	44	F	11 years (1926)	Atrophic all joints	Acute, partial disability	Zoalight, cabinet baths, typhoid vaccine, salicylates, autogenous vaccine, sulphur baths	June 1937	Still under treatment	50,000-200,000		None	Not present	Occasional slight pain	Good function of all joints except left hand and wrist and right wrist	142 lbs	157 lbs	Able to work full time, sleeps well, appetite good, treatment being continued

of little or no value in altering the course of the disease."

The above results and conclusions are distinctly at variance with the findings of other observers in this field, and especially with my own clinical experience. Neither Livingston nor Steck observed alteration in serum calcium and phosphorus.

Prompted by the report of Abrams and Bauer, I proceeded to restudy a series of 15 patients who had received or who were receiving vitamin D therapy for arthritis. Seven were receiving active therapy; in eight, therapy had been discontinued. The significant objective findings appear in tables 1 and 2.

TABLE 2

Case No.	Date of Examination	Hemoglobin (Per Cent)	Erythrocytes (Millions per cmm.)	Leukocytes (Thousands per cmm.)	Sedimentation Rate	Calcium (Mg. per 100 cc.)
1	11-15-37	75	4.43	7.00	13	
	3- 7-38	80	4.15	7.65	12	
	8-23-38	80	4.44	10.50	14	
	11-16-38	80	4.26	7.60	9	9.51
	2-28-39	80	4.16	10.15	11	9.90
2	11-13-37	90	4.78	7.60	8	
	8-23-38	90	4.85	8.70	7	
	11-21-38	90	5.08	7.15	5	9.71
	2-11-39	90	4.96	10.00	5	9.42
3	11-15-37	85	4.69	14.90	20	
	8- 6-38	85	4.51	10.60	16	
	11-15-38	80	4.58	11.15	18	10.2
	2-28-39	80	4.92	10.15	16	10.0
4	11-13-37	90	4.61	13.45	19	
	3- 5-38	90	4.77	9.20	7	
	7-30-38	90	4.90	10.50	21	
	11-19-38	80	4.28	10.65	18	9.51
	2-25-39	80	4.78	10.50	15	9.48
5	11-15-37	90	4.58	7.20	13	
	3- 4-38	85	4.57	6.40	13	
	11-22-38	80	4.34	8.80	10	9.51
	2-28-39	85	4.40	8.10	7	9.50
6	11-11-37	85	4.38	15.40	20	
	3- 8-38	85	4.58	9.70	18	
	8-20-38	85	4.43	14.70	20	
	11-17-38	85	4.57	17.80	18	9.71
	2-27-39	90	5.58	15.80	14	9.90
8	11-16-37	90	4.92	10.85	13	
	3-11-38	85	4.58	7.80	22	
	9- 8-38	85	4.39	10.10	16	
	11-18-38	80	4.35	7.00	13	9.42
	2-10-39	90	4.64	7.60	13	9.81
9	11-13-37	85	4.66	6.70	16	
	8-22-38	90	4.66	8.70	15	
	11-16-38	90	4.62	9.35	12	9.80
	3-22-39	90	4.63	9.90	12	10.27
10	11-15-37	75	4.38	8.40	32	
	3-22-38		3.04	4.80	32	
	8-30-38	90	4.69	11.30	30	
	12- 5-38	80	4.68	10.40	29	9.39
	3-13-39	90	4.68	8.90		10.51
11	11-12-37	75	3.77	8.30	32	
	3- 2-38	85	4.44	8.60	28	
	8-15-38	75	3.87	7.35	31	
	11-17-38	80	4.18	12.75	35	10.59
	2-16-39	90	4.88	17.00	32	9.71
12	11-13-37	85	4.59	11.70	10	
	3- 7-38	85	4.49	6.40	7.5	
	8- 5-38	85	4.67	10.00	10	
	11-19-38	80	4.16	6.80	8	11.27
	3-11-39	85	4.26	7.45	5	9.49
16	11-30-37	65	4.25	9.20	28	
	3- 9-38	70	4.11	7.00	23	
	8-26-38	90	4.69	9.60	27	
	12-20-38	85	4.34	9.90	24	9.19
	3-16-39	80	4.29	11.20	23	9.08
17	11-20-37	90	5.02	11.00	10	
	8-26-38	90	4.50	8.80	5	
	11-15-38	90	4.69	6.70	7	9.61
	2-15-39	90	4.72	6.60	3	9.52
19	11-20-37	80	4.22	8.90	19	
	11-20-38	90	4.71	8.00	16	10.29
	3-12-39	85	4.63	11.70	26	9.08
20	11-20-37	90	5.48	9.70	16	
	3- 5-38	80	4.26	11.30	5	
	8-29-38	75	4.10	9.20	19	
	12- 3-38	75	3.92	9.00	12	12.02
	3- 9-39	85	4.45	11.90	10	10.00

DISCUSSION

An examination of the results obtained demonstrates that they are at variance with those of Abrams and Bauer, but are in complete accord with those of Livingston and Steck. In no case did the blood calcium rise to dangerously high levels, and in only one (case No. 20) was there an elevation of the serum calcium level above 11.27 mg. per cent. In most patients the blood calcium level was less than 10 mg. per cent, even after the administration of large doses of vitamin D for many months or years.

It has been the experience of the writer and that of others that the benefit derived from this vitamin D preparation in the treatment of arthritis cannot be obtained with ordinary ultraviolet-irradiated ergosterol or certain other forms of vitamin D. This observation, together with the fact that Ertron has been shown not to produce the elevation of the blood serum calcium so characteristic of other forms of vitamin D, has led us to subscribe to the thought that vitamin D, as we know it, is not a distinct chemical entity but is probably a group of substances, each component of which is capable of curing experimentally produced rickets in the rat. It is the contention of the writer that the property of antirachitic potency in no way reflects the chemical nature of the vitamin D under observation, and gives no indication of other substances which might be present and which might exert an entirely different pharmacodynamic influence. Following this line of reasoning, it seems clear that not all forms of vitamin D influence the level of blood serum calcium and phosphorus in an identical manner. Furthermore, it seems apparent that the dosage of a given preparation measured in terms of antirachitic potency is no indication of its toxic potentialities. This thought appears further substantiated by McCollum, Orent-Keiles, and Day,[7] who state: "The properties of vitamin D are exhibited by at least eleven different sterol derivatives." Obviously, the designation "vitamin D" does not accurately classify the chemical nature of an antirachitic substance, but merely gives some indication of one of its pharmacologic properties.

This vitamin D preparation is activated from ergosterol by means of an exclusive method (Whittier process), hence differs from the type of vitamin D used by Abrams and Bauer. The conclusion is valid, therefore, that *the results reported by Abrams and Bauer are applicable only insofar as the type of vitamin D they employed is concerned, and are possibly not applicable to vitamin D obtained by any other process.* Experimental studies are now being carried on to establish differences and, if possible, means of differentiation between various forms of vitamin D.

SUMMARY

In the treatment of 15 arthritic patients with this vitamin D preparation, no toxic reactions occurred;

serum calcium levels were not elevated beyond normal limits.

The unqualified designation "vitamin D" is inaccurate and incomplete, since it makes no allowance for the differences in toxicity that are known to exist between the various forms of vitamin D. The method of activation appears to be the responsible agent in the production of the unknown substances which produce elevation of the blood serum calcium and which are responsible apparently for the subjective symptoms of intolerance.

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Book Reviews

Urology, by DANIEL N. EISENDRATH, M.D., consulting urologist to the American Hospital, Paris, France, and HARRY C. ROLNICK, M.D., attending urologist, Michael Reese, Mt. Sinai, and Cook County Hospitals, Chicago; 1061 pages, with 762 illustrations; Philadelphia: J. B. Lippincott Company, 1938. Price, $10.00.

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This is the fourth edition of this volume which represents an authoritative and complete presentation of the entire field of urology. The authors are aided by Stein and Muschat in the chapters on gonorrhea in the female and on the neurogenic dysfunction of the bladder. The entire treatise is well written and outlined and is thorough enough to appeal to the busy practitioner and the urologist. Of value to the general practitioner are the chapters on genito-urinary tract infections which deal with the newer knowledge of diagnosis and treatment and the chapters on sex neuroses, undescended testicle, and nephritis. Minor urological technique is covered thoroughly.

The chapters on operative technique and postoperative treatment are especially recommended to the urologist and general surgeon, being a lucid and adequate presentation of the entire field of urologic surgery, with numerous illustrations of procedures which have proved to be of practical value to the authors and their associates.

Urinary tract anomalies and the subject of bladder neck obstruction have been carefully presented by the authors who are recognized by their extensive studies in these fields.

Diseases of the Nose, Throat and Ear, by W. WALLACE MORRISON, M.D., clinical professor and chief of department of otolaryngology, New York Polyclinic Medical School and Hospital; 675 pages with 334 illustrations; Philadelphia: W. B. Saunders Company, 1938. Price, $5.50 net.

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This volume is a compilation of material gathered and organized from Dr. MORRISON'S teaching. It is written to serve the undergraduate medical student and the general practitioner. The author's objective is to be practical, to state all necessary facts in order to clarify the subject, and to enable the student and practitioner to apply this knowledge for the aid of the sick. A short resume of the essential points in surgical anatomy is given in each section of the book. This is immediately followed by the physiological considerations of the parts concerned. When the etiology of the disease is known, it is stated simply. Pathological conditions are described and are illustrated. The signs and symptoms of each clinical entity are listed in their order of appearance and importance. Methods of examination are described and illustrated so the student and the general practitioner may learn to make a complete and satisfactory physical examination. Diagnoses are presented and prognosis is discussed. The simpler operations in this field are fully described and illustrated. The outstanding features of this book are two: namely, data are simple and practical.

Infections of the Hand, by ALLEN B. KANAVEL, M.D., Sc.D., F.A.C.S., late professor of surgery, Northwestern University Medical School; 7th edition, thoroughly revised, 503 pages, 299 engravings; Philadelphia: Lea & Febiger, 1939. Price, $6.00.

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This is the last written work of the late ALLEN B. KANAVEL. The rearrangement of its contents in this edition makes for a better presentation of the subject. The addition of several detailed illustrations aids materially in clarifying the anatomy of the hand and forearm in relation to infection in these structures.

The author emphasizes that the adequate care of open injuries to the hands consists of cleanliness, using soap and water, using irrigations of the wound and complete debridement where it is possible to be carried out. It is pointed out that antiseptics cause cell and tissue death in a clean wound, thereby defeating the purpose for which they are employed.

The use of elevation, adequate immobilization of the part and bed rest are still advocated by the author in the treatment of infection, just as he has continuously done since the first edition of this monograph.

The diagnosis and methods of treatment for the various infections of the hand and forearm as advanced in this work have been arrived at by a rational consideration of the anatomy of the part and of the pathology produced. Any physician having to manage these infections will find valuable information in this volume that will be helpful. The place of incising for the evacuation of pus in the spaces of the hand and forearm is clearly described and diagramed.

Textbook of Anatomy and Physiology, by DIANA CLIFFORD KIMBER, CAROLYN E. GRAY, A.M., R.N., and CAROLINE E. STACKPOLE, A.M.; 10th edition, revised and rewritten, blue fabrikoid, gold-stamped, 604 pages plus references, glossary and index, 276 figures; New York, the Macmillan Co.: 1938. Price, $3.00.

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This is a textbook for student nurses, written with the contention that it is a good thing for such students to study anatomy and physiology simultaneously. Hence, anatomy is presented in association with physiology in this work, which begins with a discussion of hygiene, proceeds to the somatic cells, tissues, and organs, the skeletal system, circulatory system, the ductless glands, and concludes by describing the sensory organs and the reproductive system. The book is exceptional in that certain subjects and technics, usually considered too simple for inclusion in more pretentious textbooks of this type, are thoroughly and clearly explained. Some of the line drawings are augmented by color, an arrangement useful to the student in distinguishing parts of the body, different systems, and structural details.

The subject material is said to conform to that recommended in the course in anatomy and physiology of the curriculum of the National League of Nursing Education. Dr. George W. Corner, of the University of Rochester, assisted in the preparation of the chapters on embryology and the reproductive system. Miss Gray has been associated with City Hospital, New York City, and Miss Stackpole is associate in biology, Columbia University Teachers College.

The
JOURNAL LANCET

Represents the MINNESOTA, NORTH DAKOTA *Medical Profession of* SOUTH DAKOTA and MONTANA

The Official Journal of the

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MINNEAPOLIS, MINN., SEPTEMBER, 1939

LIFE PRECEDES LIFE

Would it not be interesting to know who and where each of us was, say one or two thousand years ago? Some, to be sure, do not seem to care. We find in history-taking that patients cannot always give their own anamnesis; and when it comes to the family history, they are at a loss to give the ages of grandparents or even of parents. This slothful but exceedingly common type of indifference must make the paleontologist frown. While he is searching fossil remains for evidence of the earliest animal life on our planet, the present living individual can rarely trace his ancestry for the past 100 years.

Is it not rather indecent not to know what one is made of? Whether mongrels or thoroughbreds, we should know something about our forebears. We wager that astrological predictions would have to take a back seat if the individual knew more about his mundane chromosomes. Let us hope that some practical-minded genealogist will get out a family history book that can be distributed at small cost to each family for the benefit of future generations.

A. E. H.

THE TRAINING AND DEVELOPMENT OF THE PHYSICIAN IN HUMAN CONTACTS

It is common talk in medical circles today that the members of the medical profession do not enjoy the respect and honor which was accorded their predecessors in the profession. While this is probably not true, the fact remains that in this day of the urbanization of a large part of our population and of specialization in medicine, the average physician has lost much in human contacts which his predecessor, the old family doctor, had. The family doctor knew each member of the family, often from birth. He knew the individual's failings and fine points. He even knew the family fields and the family horses. He knew what each individual member of the family had to fight. On the other hand, in modern times there has been so much technical knowledge to master that many men are leaving medical school

with a superb technical training and very little knowledge of the human heart or the things that men live by. And what is worse, some of the members of our profession never seem to acquire this knowledge. We have left too much to our psychiatrists and there are not enough good psychiatrists to go around. And even if there were they would probably be more or less concentrated in the cities. So that it is obvious that the general practitioner and the internist especially must fit into the lives of their everyday patients as does the psychiatrist in his very special way into the lives of his maladjusted patients. And one wonders as one sees the younger men come into active work each year just how much training our medical students and interns and practicing physicians are getting in this very important matter of human relations. And how can they be so trained?

In the first place, it is evident that any doctor may mean more to his patients if he knows something of the world's history, of the long weary trek which mankind has traveled to get to what we are wont to call modern civilization. Of course, as we see the world again preparing for war, as we see racial and religious intolerance rampant, we cannot but wonder whether we may not be back-tracking. Nevertheless, there are bits of history every doctor should know; there are books and pictures and music that the world has lived by down through the ages, and the doctor can mean more to his patients if he knows something of the beauty that a few rare spirits have found and have interpreted for us.

Of course, after all is said and done, no amount of training either cultural or technical can take the place of character or of an essential kindliness and tact which must be a part of the armamentarium of every physician who is to enter really into the lives of his patients. There are so many things that sick people may need more than they need medicine, perhaps even more than they need extensive laboratory study. And this is not intended to decry in any way the value of scientific diagnosis or the value of careful laboratory study. People come to the doctor with their troubles, mental and emotional, as well as physical, and many times a little decent human understanding is more important than the diet or medicine which he may prescribe. Sometimes the light in the doctor's eye may be a very important thing about him in bringing his patient back to physical and mental health, in giving him a new outlook, and in lifting the load from his tired shoulders.

We thoroughly fear the political control of medicine, but in just so far as we are helping to humanize the practice of medicine, in just so far as we are training our young doctors in the art of understanding the human heart, in just so far as we decrease the very small percentage of medical bandits whom we have in our midst, and replace them with understanding and kindly physicians, are we going to retain the confidence of our people and make political control of medicine in this country very difficult, if not impossible.

H. W. G.

THE VETERINARIAN AND DISEASE CONTROL

The article in this issue of THE JOURNAL-LANCET entitled, "Infectious Equine Encephalomyelitis," by Dr. Charles E. Cotton is an example of the rôle which the veterinarian plays in the control of disease not only in animals but also in man. Here Dr. Cotton sums up the subject in all of its phases and emphasizes especially the transmissibility of this disease to man. He calls attention to the importance of controlling this disease in animals, particularly horses, and presents much information which every physician should have with reference to the disease in man.

Since the first veterinary school was opened in Lyons, France, in 1762, one of the major activities of the profession has been to protect human beings against diseases of animals. In doing so, many veterinarians have lost their lives through contracting diseases from animals, such as glanders, anthrax, erysipelas of swine, rabies, undulant fever, and tuberculosis. Many others have been invalided over varying periods of time from animal diseases. Some have died from injuries sustained while treating domestic animals.

Despite all this, the veterinarian has pressed forward and has controlled disease transmissible from animals to man in such a manner that much of the good health which this nation enjoys is due to his efforts. There was a time when the veterinarian was referred to as the "horse doctor" or the "cow doctor," when he was looked down upon by members of the medical profession. Since the first veterinary school was opened in the United States at Ames, Iowa, in 1879, the standards of veterinary education have constantly increased until today the regular four-year course in veterinary medicine is preceded by one year of college work and in many instances by two. Indeed, today the veterinarian is among the best educated persons in his community. Everywhere the veterinarians work hand in hand with the medical profession. They are called upon to speak before medical organizations and any medical man should look upon it as a high honor to be called upon to speak before a veterinary organization.

In addition to the enormous volume of practical work which the veterinarians do for the health of the people and their domestic animals, they have done and are continuing to do some of the finest research of all time. The work of Dr. Cotton and his allies in the protection of man against a disease of horses is not his first great contribution. He played a leading rôle in the control of tuberculosis among the cattle of this nation and just now he is engaged in the solution of another great problem, namely, the control of brucellosis in animals, which must result in the control of undulant fever. Any medical society will do well to have on its program from time to time a veterinarian such as Dr. Cotton.

J. A. M.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON JULY 6, 1939

JUNE EXAMINATION

Name	School	Address
Barnett, Joseph Morton	U. of Minn., M.B. 1938	1117 Upton Ave. N., Minneapolis, Minn.
Birnberg, Victor Jack	U. of Minn., M.B. 1938	Mpls. General Hospital, Minneapolis, Minn.
Blackwell, William Joseph	Northwestern, M.B. 1935, M.D. 1936	Mayo Clinic, Rochester, Minn.
Blomberg, Robert David	U. of Minn., M.B. 1939	Hurley Hospital, Flint, Mich.
Brooke, James William	U. of Ore., M.D. 1938	Lancaster, Minn.
Burks, James Willis, Jr.	Washington U., Mo., M.D. 1937	Mayo Clinic, Rochester, Minn.
Christiansen, Harold Aug.	U. of Minn., M.B. 1938, M.D. 1939	502 Oak St. S. E., Minneapolis, Minn.
Coulter, Everett Benjamin	U. of Minn., M.B. 1939	Mpls. General Hospital, Minneapolis, Minn.
Coventry, Markham Bingham	U. of Mich., M.D. 1937	Mayo Clinic, Rochester, Minn.
Craig, David Mark	U. of Minn., M.B. 1939	Milwaukee County Hosp., Wauwatosa, Wis.
Cronin, Donald Joseph	U. of Minn., M.B. 1939	Mpls. General Hospital, Minneapolis, Minn.
Douglas, Kenneth Wallace	U. of Minn., M.B. 1939	Tacoma General Hospital, Tacoma, Wash.
Engstrom, William Weborg	U. of Minn., M.B. 1939	3000 Humboldt Ave. N., Minneapolis, Minn.
Fink, Daniel Louis	U. of Minn., M.B. 1938	3407 Lyndale Ave. S., Minneapolis, Minn.
Fogarty, Charles William, Jr.	U. of Minn., M.B. 1938	1826 Summit Ave., St. Paul, Minn.
Forsythe, James Robert	U. of Minn., M.B. 1939	Kings County Hospital, Brooklyn, N. Y.
Fredricks, Merriam Gerard	U. of Minn., M.B. 1939	Milwaukee County Hosp., Wauwatosa, Wis.
Goehrs, Gilman Henry	U. of Minn., M.B. 1938	118—16th Ave. S., St. Cloud, Minn.
Haisten, Arnold Sessions	U. of Pennsylvania, M.D. 1936	Mayo Clinic, Rochester, Minn.
Hampton, Hiram Phillip	Emory U., M.D. 1937	Mayo Clinic, Rochester, Minn.
Hay, Lyle Joseph	U. of Minn., M.B. 1937, M.D. 1938	University Hospital, Minneapolis, Minn.
Heckel, Donald Q.	U. of Minn., M.B. 1939	San Bernardino Co. Hosp., San Bernardino, Calif.
Jacobson, Charles Edward, Jr.	Cornell U., M.D. 1935	Mayo Clinic, Rochester, Minn.
Jacobson, Wyman E.	U. of Minn., M.B. 1939	Hurley Hospital, Flint, Mich.
Kaplan, Harry Arthur	U. of Minn., M.B. 1937	213 W. 3rd St., Duluth, Minn.
Kelly, Clarence Andrew	Marquette U., M.D. 1939	Dresser Junction, Wis.
Kelsey, Chauncey Miller	U. of Minn., M.B. 1939	Hinckley, Minn.
Koskela, Lauri Edwin	U. of Minn., M.B. 1938	Rood Hospital, Coleraine, Minn.
Lindert, Merlyn Carl Fred	U. of Minn., M.B. 1938	Milwaukee County Hosp., Wauwatosa, Wis.
Lindley, Stanley Bryan	U. of Minn., M.B. 1938	515 Delaware St. S. E., Minneapolis, Minn.
MacMillan, David Glenn	U. of Minn., M.B. 1939	St. Mary's Hospital, Duluth, Minn.
MacPherson, Malcolm Morrison	U. of Manitoba, M.D. 1935	Mayo Clinic, Rochester, Minn.
Magner, Charles Edgar	Rush Med. Col., M.D. 1938	Malta, Mont.
Monserud, Nels Ordell	Rush Med. Col., M.D. 1938	Raiter Hospital, Cloquet, Minn.
Mooney, Robert Davis	U. of Minn., M.B. 1938	418 Beacon Ave., St. Paul, Minn.
Morrison, William Forster	U. of Minn., M.B. 1938	1017—18½ Ave. N. E., Minneapolis, Minn.
Musachio, Nicholas Frank	U. of Minn., M.B. 1938	Eden Valley, Minn.
O'Leary, John Hall	U. of Minn., M.B. 1938	709 E. 14th St., Minneapolis, Minn.
Phalen, George Smith	Northwestern, M.B. 1937, M.D. 1938	Mayo Clinic, Rochester, Minn.
Raszkowski, Harvey Joseph	U. of Wis., M.D. 1936	Mayo Clinic, Rochester, Minn.
Richardson, Robert Joseph	U. of Minn., M.B. 1938	Rushford, Minn.
Satory, John Joseph	U. of Minn., M.B. 1938	Wabasha, Minn.
Schwyzer, Hanns Carl	U. of Minn., M.B. 1938	8 Crocus Hill, St. Paul, Minn.
Selmo, Joseph	Loyola U., M.D. 1939	Box 16, Caspian, Mich.
Sickels, Edward Worman	U. of Minn., M.B. 1939	Harper Hospital, Detroit, Mich.
Stewart, Marvin Jerome	U. of Minn., M.B. 1939	Miller Hospital, St. Paul, Minn.
Stoen, Harold Jennings	Rush Med. Col., M.D. 1936	U. S. Marine Hospital, Cleveland, Ohio.
Swenson, Orrin Endre	U. of Wis., M.D. 1938	419 N. Prairie St., Stoughton, Wis.
Trow, James Edward	U. of Minn., M.B. 1939	Charity Hospital of La., New Orleans, La.
Veranth, Leonard Anthony	Marquette U., M.D. 1939	7 W. Sheridan St., Ely, Minn.
Weisman, Sydney Jerald	U. of Minn., M.B. 1939	Buffalo City Hospital, Buffalo, N. Y.
Weismann, Rodger E.	U. of Iowa, M.D. 1938	Houston, Minn.
Westrup, John Edward	Marquette U., M.D. 1939	Maple Lake, Minn.
Williams, Bill Henry	U. of Minn., M.B. 1937, M.D. 1938	University Hospital, Minneapolis, Minn.
Williams, John Alexander	U. of Minn., M.B. 1939	St. Mary's Hospital, Duluth, Minn.
Zinter, Ferdinand A.	U. of Minn., M.B. 1938	600 Phys. & Surg. Bldg., Minneapolis, Minn.

BY RECIPROCITY

Clark, Richardson Evans	U. of Iowa, M.D. 1936	Spring Valley, Minn.
Eyres, Thomas Edward	U. of Iowa, M.D. 1932	Pequot, Minn.
Pewters, John Thomas	U. of Minn., M.B. 1937, M.D. 1938	1620 W. 32nd St., Minneapolis, Minn.
Witherspoon, Jackson Thornwell	Johns Hopkins U., M.D. 1928	84 S. 10th St., Minneapolis, Minn.

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Cunningham, Bernard Poland	New York Univ., M.D. 1936	Mayo Clinic, Rochester, Minn.
Olson, Lorin Magnus	Northwestern, M.B. 1938, M.D. 1939	Chisago City, Minn.

William James Mayo

William James Mayo, M.D., M.D. in Surgery, LL.D., D.Sc., F.A.C.S., F.R.C.S. (England), F.R.C.S. (Ireland), F.R.C.S. (Edinburgh), F.R.S.M. (London), was born at LeSueur, Minnesota, on June 29, 1861, the eldest son of Dr. William Worrall Mayo. He was taken to Rochester at the age of one and a half years by his parents, was graduated from the Rochester High School at the age of sixteen, and attended Niles Academy. In 1883 he received the degree of Doctor of Medicine from the University of Michigan, and in 1890 the same institution awarded him the degree of Master of Arts. He was certificated by the New York Post-Graduate Medical School in 1884; and received the degree of Doctor of Medicine in 1885 from the New York Polyclinic Medical School and Hospital. From 1906 onward he was awarded honorary degrees, medals, decorations, and various memberships by universities, special societies, and heads of governments in nearly every part of the world, from Serbia and Finland to Peru and New Zealand.

President of the Minnesota State Medical Association in 1895-1896, Dr. Mayo in 1899 became a member of the first board of editors of the old *St. Paul Medical Journal*, in which endeavor he was associated with such physicians as William Osler, H. Longstreet Taylor and Richard C. Cabot, all of whom served the aforementioned journal. Dr. Mayo from the beginning of his career was deeply concerned in the progress and quality of medicine and medical practice in the state of his birth. He first attended a meeting of the American Medical Association in 1882, while he was still a medical student, the meeting that year being held in St. Paul. He entered into medical practice in 1883, in association with his father in Rochester, his certificate of licensure bearing the date November 12, 1883. His younger brother, the late Charles Horace Mayo, joined him in practice in 1888. In 1915, when it became apparent that the experience and resources of the group of physicians headed by William J. and Charles H. Mayo offered opportunities to physicians for special postgraduate study not available elsewhere within many miles of the state of Minnesota, The Mayo Foundation for Medical Education and Research was endowed by the two brothers and was established as one unit of the Graduate School of the University of Minnesota.[1] Four Fellows of the Foundation were awarded university degrees in 1917.

Following his elevation to the presidency of the American Medical Association in 1906, Dr. Mayo was chosen head of many organizations in the years thereafter. He was president of the Society of Clinical Surgery, 1911-1912; of the American Surgical Association, 1913-1914; of the American College of Surgeons, 1917-1919; of the Congress of American Physicians and Surgeons, 1925; and of the Inter-State Postgraduate Medical Association of North America, 1932-1933. He was a Regent of the University of Minnesota from 1907 until his death, and, like his brother, Charles H. Mayo, was a major, then colonel, in the United States Army Medical Corps during the World War, and a brigadier general in the Auxiliary Reserve Corps from 1921 until his death. He received the Distinguished-Service Medal under General Order No. 69, War Department, 1919.

Dr. Mayo was awarded the gold medal of the National Institute of Social Sciences in 1918; the Henry Jacob Bigelow gold medal of the Boston Surgical Society in 1921; the Royal Order of Commander of the Northern Star (Sweden) in 1927; the Finlay Congressional Distinguished Service Medal of the Republic of Cuba in 1929; the gold medal (past president's) of the American Medical Association in 1930; the Cross of Knight Commander of the Royal Order of the Crown of Italy in 1932; the bronze medal of the Inter-State Postgraduate Medical Association of North America in 1936; and others.

So much has been said and written about Dr. Mayo and so many tributes were tendered him during his lifetime that many issues of THE JOURNAL-LANCET would be required to print them *in extenso*. They have ranged from such a simple but impressive statement of fact as "He was the greatest man I ever knew," said by Dr. William David Haggard, clinical professor of surgery in the Vanderbilt University School of Medicine and president of the American Medical Association in 1925, to "Will Mayo, the human dynamo, philosopher, planner, doer, and intolerant of half-way methods or part powers . . ."[2], written by the late Dr. Franklin H. Martin, co-founder and managing director of the American College of Surgeons.

Dr. Mayo was a Fellow of the Royal Society of Medicine (England), the Royal College of Surgeons (England), the Royal College of Surgeons (Ireland), and the Royal College of Surgeons (Scotland), foreign associate of the Académie de Médecine de France, academician of the Accademia Reale Medica di Roma, and Honorary Fellow of the College of Physicians of Philadelphia. He was a member of the honorary academic fraternities Alpha Omega Alpha, Phi Beta Kappa and Sigma Xi.

Dr. Mayo was associate foreign member, corresponding member or honorary member of forty-four medical organizations in Argentina, Brazil, Denmark, Ecuador, England, Finland, France, Germany, Ireland, Italy, Mexico, New Zealand, Peru, Scotland, Spain, the United States, Uruguay and Yugoslavia. For many years he maintained membership in the Minnesota Academy of Medicine, the Minnesota Academy of Science, the Minnesota Pathological Society, the Minneapolis Surgical Society and the Southern Minnesota Medical Association.

In 1931, the Honorary Secretary of the Royal Australasian College of Surgeons wrote to Dr. Mayo, in part as follows: "It is the desire of the Council of the College to confer its Honorary Fellowship upon you. As, unfortunately, this cannot be conferred in absentia, the Council trusts that, at some not distant date, you may be able to pay another visit to Australia and thus give the College the opportunity to honour you as it desires." Great traveller that he was, it seemed likely that Dr. Mayo would visit Australia in his later years but his death prevented this and the fellowship, the offer of which pleased him greatly, was not actually conferred.

Dr. Mayo died at Rochester on July 28, 1939. The body lay in state at Mayo Foundation House on Sunday, July 30, and was interred on the afternoon of the same day at Oakwood Cemetery in Rochester, where his father, William Worrall Mayo, and his brother, Charles Horace Mayo, are buried.

REFERENCES

1. Bulletin No. 27, Graduate School, University of Minnesota, (Aug.) 1916.

2. Martin, F. H.: Digest of the proceedings of the Council of National Defense during the World War, 73rd Congress, 2nd session, Senate Document No. 193, ed. 1, Washington, Government Printing Office, 1934, p. 478.



William James Mayo
1861-1939

Future Meetings

FIFTIETH ANNIVERSARY OF THE MEDICAL SCHOOL OF THE UNIVERSITY OF MINNESOTA

October 12, 13, 14, 1939

THEME: *Some Trends in Medical Progress with Particular Reference to Chemistry in Medicine.*

Anniversary Celebration

Half a century ago three private medical schools in Minneapolis and St. Paul turned over their charters and their properties to the Regents of the University of Minnesota. This occurred not by mere chance, but because of the untiring and statesmanlike efforts of a group of physicians, headed by Dr. Perry H. Millard, who envisioned for the State of Minnesota a single, strong, progressive Medical School as part of the State University.

The development of this school over its first half century—less than the life span of a single individual—has far exceeded the hopes and expectations of its founders. To take stock of progress to date, to pay tribute to the founders of the School and the builders of its name and to cast glances toward the future the special program herein described has been arranged.

The scientific sessions have been planned primarily for alumni, students, faculty, and other physicians, and scientists in related fields. To the University Convocation on Thursday morning and the General Session in Northrop Auditorium on Thursday evening the general public is especially invited; but all who are interested are cordially welcome to attend any of the sessions.

Schedule of Events

Monday to Wednesday, October 9, 10, 11—Medical Clinics arranged by Division of Postgraduate Medical Education.

Thursday, Friday, October 12, 13—Special Anniversary Program.

Saturday Morning, October 14—Aniversary Clinics.

Saturday Afternoon, 2:00 O'Clock—Football game, Purdue University vs. University of Minnesota, Memorial Stadium.

PROGRAM

for the Commemoration of the Fiftieth Anniversary of the Founding of the Medical School of the University of Minnesota

Thursday, October 12, 1939

Morning Session, 9:00 O'Clock
Auditorium of Music Building

"The Colloid Chemistry of Membranes in Living Organisms"—Herbert M. Freundlich, distinguished service professor, University of Minnesota.

"The Performance of Osmotic Work in Living Systems"—Maurice B. Visscher, professor of physiology, University of Minesota.

"Some Reactions by Which Solutes May Be Differentially Concentrated by the Kidney"—John P. Peters, professor of medicine, Yale University.

"Medical Education, Research, and the Public Health"—Thomas Parran, Jr., surgeon-general, United States Public Health Service (University Convocation Address, 11:30 a. m., Northrop Auditorium).

Luncheon Round-Table Discussions, 12:30 O'Clock
Minnesota Union

"The Clinical Significance of Water and Electrolyte Balances."

"Blood Regeneration in the Anemias."

"Clinical Problems of Thrombosis."

"Current Trends in Public Health."

Afternoon Session, 2:30 O'Clock
Northrop Auditorium

"Organic Chemistry in the Pursuit of Vitamin Research"—Lee I. Smith, professor of organic chemistry, University of Minnesota.

"Investigations in Metabolism of the Fatty Acids"—George E. Burr, professor of physiological chemistry and botany, University of Minnesota.

"Production, Utilization and Significance of Blood Proteins" (annual lecture of the Minnesota Pathological Society)—George H. Whipple, professor of pathology and dean of the medical school, University of Rochester.

"Investigations in the Problem of Thrombosis"—Charles H. Best, professor of physiology, University of Toronto.

Evening Session, 8:00 O'Clock
Northrop Auditorium

"Medicine and the Commonwealth"—The Honorable Harold E. Stassen, Governor of the State of Minnesota.

"The Place of Medicine in a University"—Guy Stanton Ford, president, University of Minnesota.

"The Role of the Fundamental Sciences in Medical Progress" (the first Elias Potter Lyon lecture)—Anton J. Carlson, distinguished service professor of physiology, University of Chicago.

Friday, October 13, 1939

Morning Session, 9:00 O'Clock
Northrop Auditorium

"Microbic Respiration"—A. J. Kluyver, professor of microbiology, Delft, Holland.

"The Biology of Animal Virus Diseases"—Robert G. Green, professor of bacteriology, University of Minnesota.

"Observations upon the Mode of Action of Sulfanilamide and Its Derivatives"—Perrin H. Long, associate professor of medicine, Johns Hopkins University.

"Chemistry in Urinary Antisepsis"—Henry F. Helmholz, professor of pediatrics, The Mayo Foundation, University of Minnesota.

Luncheon Round-Table Discussions, 12:00 O'Clock
Minnesota Union

"Chemotherapy".

"Clinical Aspects of the Vegetative Nervous System."

"Clinical Physiology of the Gastro-Intestinal Tract."
"Neurophysiology".
"Recent Advances in Bacteriology."

Afternoon Session, 2:00 O'Clock
Auditorium of Music Building

"The Chemical Approach to the Problem of Convulsive Mechanisms"—Irvine McQuarrie, professor of pediatrics, University of Minnesota.

"Methods of Analysis of Nervous Action"—Herbert S. Gasser, director, Rockefeller Institute for Medical Research.

"The Nervous System in the Regulation of Visceral Processes"—Detlev W. Bronk, professor and director, Institute of Neurology, University of Pennsylvania.

"The Argument for Chemical Mediation of Nerve Impulses" (the annual Alpha Omega Alpha lecture)—Walter B. Cannon, professor of physiology, Harvard University.

Evening Session, 6:30 O'Clock
Ballroom, Minnesota Union

"The Medical School of the University of Minnesota in Retrospect and Prospect"—Harold S. Diehl, dean of the medical sciences, University of Minnesota.

"The Medical School from the Point of View of the Alumni" (the Herman M. Johnson lecture of the Minnesota State Medical Association)—Olaf J. Hagen, Class of 1906, Moorhead, Minnesota.

"Graduate Medical Education"—Donald C. Balfour, director, The Mayo Foundation, University of Minnesota.

Presentation of Distinguished Service Award of Minnesota State Medical Association Posthumously to Dr. William J. Mayo, Dr. Charles H. Mayo, and Dr. Herman M. Johnson—Dr. George Earl, president of the Minnesota State Medical Association.

"Progress in Medical Education on the American Scene"—Richard E. Scammon, distinguished service professor, University of Minnesota.

Saturday, October 14, 1939

Morning Session, 9:00 O'Clock
Amphitheater, University Hospital

Anniversary Clinics

"The Surgical Consideration of Essential Hypertension"—Alfred W. Adson, professor of neurosurgery, The Mayo Foundation, University of Minnesota.

"A Physiological and Surgical Critique of the Surgeon's Role in the Management of Peptic Ulcer"—Owen H. Wangensteen, professor of surgery, University of Minnesota.

"Certain Physiologic Concepts Important in the Practice of Cardiology"—Arlie R. Barnes, professor of medicine, The Mayo Foundation, University of Minnesota.

"Some Disturbances of the Vascular System in Pregnancy"—John L. McKelvey, professor of obstetrics and gynecology, University of Minnesota.

"Sprue and Related Diseases Affecting Intestinal Absorption"—Albert M. Snell, associate professor of medicine, The Mayo Foundation, University of Minnesota.

"Jaundice Due to Cancer"—Cecil J. Watson, associate professor of medicine, University of Minnesota.

AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The American Congress on Obstetrics and Gynecology will be held in Cleveland, Ohio, September 11 to 15, 1939. Sponsored by the American Committee on Maternal Welfare, Inc., the Congress is being held for the entire medical profession.

Among the speakers are the following from Minneapolis: Dr. Jalmar H. Simons, Dr. John L. McKelvey, Dr. J. C. Litzenberg and Dr. William A. O'Brien. Dr. F. L. McPhail of Great Falls, Montana, will lead a discussion at the Public Health Section of the Congress.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Northern Minnesota Medical Association will be held at Detroit Lakes, Minnesota, Sept. 8 and 9, 1939. A practical and varied program has been arranged by Dr. C. O. Estrem of Fergus Falls, as follows:

Friday, September 8, 1939

8 A. M. Morning Session

"The Use of Metal in Fractures"—Dr. Joel C. Swanson, Fargo.

"Painful Conditions about the Head and Face"—Dr. Gordon R. Kamman, St. Paul.

"Inhibition Ileus"—Dr. E. A. Heiberg, Fergus Falls.

"Pneumonia in Children"—Dr. R. E. Nutting, Duluth.

"Some Observations on Böhler's Treatment of Fractures"—Dr. B. S. Adams, Hibbing.

"Nasal Obstruction: Is It Allergic?"—Dr. C. L. Oppegaard, Crookston.

"Vertigo"—Dr. W. T. Wenner, St. Cloud.

"Tumors of the Myocardium and its covering"—Dr. W. E. Neff, Virginia.

Luncheon

Afternoon Session

"Infectious Diseases of the Thyroid"—Dr. T. O. Young, Duluth.

"Early Gastro-Intestinal Diagnosis"—Dr. George Earl, St. Paul.

"Roentgen Diagnosis in Acute Abdominal Conditions"—Dr. Leo G. Rigler, Minneapolis.

The A. M. A. Meeting—Dr. E. A. Meyerding.

Evening Session

Banquet 6:30 P. M.

Talk—Dr. O. F. Melby, Thief River Falls.
Toastmaster—Dr. E. J. Hirshboeck.
Address: "The Trend of the Times"—Senator A. O. Sletvold, Detroit Lakes.

Saturday, September 9, 1939

8:30 A. M.—Clinico, Pathological and Roentgen Conference—Drs. E. L. Tuohy, George L. Berdez, and J. R. McNutt, Duluth, also by a group of prominent medical men from Rochester.

PROGRAM
INTERNATIONAL MEDICAL ASSEMBLY
INTER-STATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

Chicago, Illinois

October 30, 31, November 1, 2 and 3, 1939

Pre-assembly clinics, October 28, post-assembly clinics, November 4, Chicago Hospitals

MONDAY, OCTOBER 30
8:00 A. M.

Diagnostic Clinic: "Nervous Indigestion"—Dr. Walter C. Alvarez, professor of medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

Diagnostic Clinic: "Low Back Pain with Sciatica"—Dr. Philip Lewin, associate professor of orthopedic surgery, Northwestern University School of Medicine, Chicago, Illinois.

Diagnostic Clinic: "Clinical Types of Nephritis"—Dr. Soma Weiss, Hersey professor of the theory and practice of physic, Harvard Medical School: physician-in-chief, Peter Bent Brigham Hospital, Boston, Massachusetts.

Intermission for Review of Exhibits

Diagnostic Clinic: "Differential Diagnosis of Lesions of Right Colon"—Dr. Fred W. Rankin, Lexington, Kentucky.

Diagnostic Clinic: "An Evaluation of the Major Operations for Cavernous Pulmonary Tuberculosis"—Dr. John Alexander, professor of surgery, University of Michigan Medical School, Ann Arbor, Michigan.

Noon Intermission
1:00 P. M.

Diagnostic Clinic: "The Use of the Bone Graft in the Treatment of Bone Tumors"—Dr. Dallas B. Phemister, professor of surgery, University of Chicago, School of Medicine, Chicago, Illinois.

Diagnostic Clinic: "The Treatment of Osteo-arthritis"—Dr. *Russell L. Haden, Cleveland Clinic, Cleveland, Ohio.*

Address: "Surgical Aspects of Peptic Ulcer"—Dr. Eldridge L. Eliason, professor of surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.

Address: "Symptoms and Diagnosis of Obscure Fever"—Dr. James G. Carr, professor of medicine, Northwestern University School of Medicine, Chicago, Illinois.

Intermission for Review of Exhibits

Address: "Surgical Treatment of Gall-Stones"—Dr. Elliott C. Cutler, Moseley professor of surgery, Harvard Medical School, Boston, Massachusetts.

Address: "Medical Treatment of Liver Disease"—Dr. Albert M. Snell, professor of medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

Address: "Infections of the Upper Urinary Tract"—Dr. C. Donald Creevy, assistant dean and associate professor of surgery and urology, University of Minnesota Medical School, Minneapolis, Minnesota.

Dinner Intermission
7:00 P. M.

Address: "Allergy as a Factor in General Medicine"—Dr. James H. Black, professor of preventive medicine, Baylor University College of Medicine, Dallas, Texas.

Address: "Management of Ileostomy and Colostomy"—Dr. Richard B. Cattell, Lahey Clinic, Boston, Massachusetts.

Address: "Use of Hormones in Obstetrics"—Dr. Frederick H. Falls, professor of obstetrics and gynecology, University of Illinois College of Medicine, Chicago, Illinois.

Address: "Abdominal Pain in Extra-Abdominal Origin"—Dr. John H. Musser, professor of medicine, Tulane University School of Medicine, New Orleans, Louisiana.

Address: "How Can High Mortality Rate from Skull Fractures be Reduced?"—Dr. Harry Mock, associate professor of surgery, Northwestern University School of Medicine, Chicago, Illinois.

Address: "Treatment of Pellagra and Associated Deficiencies"—Dr. Tom D. Spies, associate professor of medicine, University of Cincinnati College of Medicine, Cincinnati, Ohio.

TUESDAY, OCTOBER 31
8:00 A. M.

Diagnostic Clinic: "Syphilis of the Vascular System"—Dr. James E. Paullin, professor of clinical medicine, Emory University School of Medicine, Atlanta, Georgia.

Diagnostic Clinic: "Fractures of the Femur Treated by Buck's Extension"—Dr. William R. Cubbins, professor of bone and joint surgery, Loyola University School of Medicine, Chicago, Illinois.

Diagnostic Clinic: "Types of Edema and Their Treatment"—Dr. Reginald Fitz, Wade professor of medicine, Boston University School of Medicine, Boston, Massachusetts.

Intermission for Review of Exhibits

Diagnostic Clinic: "Treatment of Increased Intracranial Pressure"—Dr. Eric Oldberg, professor and head of the department of neurology and neurological surgery, University of Illinois College of Medicine, Chicago, Illinois.

Diagnostic Clinic: "Management of Obesity"—Dr. Robert W. Keeton, professor of medicine, University of Illinois School of Medicine, Chicago, Illinois.

Noon Intermission
1:00 P. M.

Diagnostic Clinic: "Diagnosis and Treatment of Tumors of the Intestine"—Dr. W. Wayne Babcock, professor of surgery and clinical surgery, Temple University School of Medicine, Philadelphia, Pennsylvania.

Diagnostic Clinic: "Diseases of the Lungs Simulating Tuberculosis"—Dr. Charles R. Austrian, associate professor of medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Address: "Anomalies of the Lower Urinary Tract"—Dr. Hugh H. Young, professor of urology, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Address: "The Physicians' Interest in Gall-Bladder Disease"—Dr. Alvah H. Gordon, professor of medicine, McGill University Faculty of Medicine, Montreal, Canada.

Intermission for Review of Exhibits

Address: "Indications for Cesarean Section"—Dr. Nicholson J. Eastman, professor of obstetrics, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Address: "Rupture of Intervertebral Disks as a Cause of Low Back Pain and Chronic Recurring Sciatica"—Dr. Alfred W. Adson, professor of neurosurgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

Address: "Cerotherapy in the Treatment of Pneumonia"—Dr. Gerald S. Shibley, associate clinical professor of medicine, Western Reserve University School of Medicine, Cleveland, Ohio.

Dinner Intermission
7:00 P. M.

Address: "Exophthalmos" (The Joseph Schneider Foundation Presentation)—Dr. Albert D. Ruedemann, Cleveland Clinic, Cleveland, Ohio.

Address: "Medical Treatment of Peptic Ulcer"—Dr. Ralph C. Brown, clinical professor of medicine, Rush Medical College, Chicago, Illinois.

Address: "The Management of Intestinal Obstruction"—Dr. Thomas G. Orr, professor of surgery, University of Kansas School of Medicine, Kansas City, Missouri.

Address: "Migraine"—Dr. Harold G. Wolff, assistant professor of medicine, Cornell University Medical College, New York, New York.

Address: "Operability of Carcinoma of the Stomach"—Dr. Verne C. Hunt, clinical professor of surgery, University of Southern California School of Medicine, Los Angeles, California.

Address: "The Present Status of Transurethral Resection"—Dr. Herman L. Kretschmer, clinical professor of surgery (genito-urinary), Rush Medical College, Chicago, Illinois.

WEDNESDAY, NOVEMBER 1
8:00 A. M.

Diagnostic Clinic: "Lesions of the Right Upper Quadrant of the Abdomen"—Dr. William F. Rienhoff, associate professor of surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Diagnostic Clinic: "Rheumatic Fever in Children"—Dr. Robert A Black, professor of pediatrics, Loyola University School of Medicine, Chicago, Illinois

Diagnostic Clinic: "Goitre and the Heart"—Dr. Wallace M Yater, professor of medicine and director of the Department of Medicine, Georgetown University School of Medicine, Washington, D. C.

Intermission for Review of Exhibits

Diagnostic Clinic: "The Present Status of the Surgical Treatment of Peptic Ulcer"—Dr. Howard K Gray, assistant professor of surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota

Diagnostic Clinic: "Experiences with the Surgical Treatment of Hypertension"—Dr. Loyal Davis, professor of surgery, Northwestern University School of Medicine, Chicago, Illinois

Noon Intermission
1:00 P. M.

Diagnostic Clinic: Dr Frank H Lahey, Lahey Clinic, Boston, Massachusetts

Diagnostic Clinic: "The Insulins in the Treatment of Diabetes"—Dr Elliott P. Joslin, clinical professor of medicine, Harvard Medical School, Boston, Massachusetts

Address: "Treatment of Acute Spreading Peritonitis Following Ruptured Appendix"—Dr William D. Haggard, professor of surgery, Vanderbilt University School of Medicine, Nashville, Tennessee

Address: "Newer Approach to the Etiology and Treatment of Angina Pectoris"—Dr William J Kerr, professor of medicine, University of California Medical School, San Francisco, California

Address: "Carcinoma of the Lung"—Dr Evarts A. Graham, professor of surgery, Washington University School of Medicine, St Louis, Missouri

Address: "Dysmenorrhea"—Dr John R Fraser, professor of obstetrics and gynecology, McGill University Faculty of Medicine, Montreal, Canada

Address: "The Hormones of the Gastro-Intestinal Tract"—Dr Andrew C Ivy, Nathan Smith Davis professor of physiology and professor of pharmacology, Northwestern University School of Medicine, Chicago, Illinois

ASSEMBLY DINNER

For members of the profession, their ladies and friends
(Informal)
7:00 P. M.

Dr. George W Crile, president of Inter-State Postgraduate Medical Association of North America, Master of Ceremonies

Addresses by: Major General James C Magee, surgeon-general of United States Army, Washington, D C Major General Ross T McIntire, surgeon-general of United States Navy, Washington, D C Other distinguished citizens of the world

THURSDAY, NOVEMBER 2
8:00 A. M.

Diagnostic Clinic: "Malaria and Narcotic Addiction"—Dr Italo F Volini, professor of medicine, Loyola University School of Medicine, Chicago, Illinois

Diagnostic Clinic: "Joint Fractures"—Dr John J Moorhead, professor of clinical surgery, New York Postgraduate Medical School, New York, New York

Diagnostic Clinic. "Modern Aspects of the Diagnosis and Management of Hypertension"—Dr Roy W Scott, professor of clinical medicine, Western Reserve University School of Medicine, Cleveland, Ohio

Intermission for Review of Exhibits

Diagnostic Clinic. "Differential Diagnosis of Tumors of the Breast"—Dr John F Erdmann, attending surgeon, New York Postgraduate Medical School, New York, New York

Diagnostic Clinic: "Clinical Types of Pituitary Disease"—Dr Walter Timme, professor of clinical neurology, Columbia University College of Physicians and Surgeons, New York, New York

Noon Intermission
1:00 P. M.

Diagnostic Clinic: "A Presentation of Dermatological Cases"—Dr Francis E Senear, professor of dermatology, University of Illinois College of Medicine, Chicago, Illinois

Diagnostic Clinic: "Diagnosis and Treatment of Diseases of the Cranial Nerves"—Dr. Walter E. Dandy, adjunct professor of neurological surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Address: "Chemotherapy in the Treatment of Pneumonia"—Dr Russell L Cecil, professor of clinical medicine, Cornell University Medical College, New York, New York

Address: "Clinical and Biological Problems of the Irradiation of the Ovary"—Professor Dott. Emanuele Momigliano, department of obstetrics and gynecology, Royal University of Rome, Rome, Italy.

Intermission for Review of Exhibits

Address: "The Clinical Use of Digitalis"—Dr. Drew W. Luten, associate professor of clinical medicine, Washington University School of Medicine, St. Louis, Missouri.

Address: "Interrelation of the Organs of Internal Secretion"—Dr. Elmer L Sevringhaus, professor of medicine, University of Wisconsin Medical School, Madison, Wisconsin

Address: "Vascular and Abdominal Surgery"—Dr. Charles H. Phifer, professor of surgery, University of Illinois School of Medicine, Chicago, Illinois.

Dinner Intermission
7:00 P. M.

Address: "Prevention and Treatment of Virus Disease"—Dr Thomas M. Rivers, Rockefeller Institute for Medical Research, New York, New York.

Address: "Stricture of the Common and Hepatic Ducts"—Dr. Waltman Walters, professor of surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota

Address and Movie: "Transplantation of the Ureters into the Recto-Sigmoid and Cystectomy for Malignant Tumor of the Bladder"—Dr. William E Lower, Cleveland Clinic, Cleveland, Ohio

Address: "Management of the Menopause"—Dr. Emil Novak, associate in gynecology, Johns Hopkins University Medical School, Baltimore, Maryland.

Address and Movie: "The Distended Colon; Its Medical and Surgical Management"—Dr. Claude F. Dixon, associate professor of surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota

Address and Movie: "Fifty Years of Eclampsia, Placenta Previa, and Cesarean Section"—Dr. Joseph B DeLee, professor emeritus of obstetrics and gynecology, University of Chicago School of Medicine, Chicago, Illinois

FRIDAY, NOVEMBER 3
8:00 A. M.

Diagnostic Clinic: "Diagnosis of Diseases of the Gall-Bladder"—Dr. Warren W Cole, professor of surgery, University of Illinois School of Medicine, Chicago, Illinois

Diagnostic Clinic: "Diet and Nephritis"—Dr James S McLester, professor of medicine, University of Alabama School of Medicine, Birmingham, Alabama

Diagnostic Clinic: "Diagnostic Significance of Pain in the Abdomen"—Dr. Irvin Abell, clinical professor of surgery, University of Louisville School of Medicine, Louisville, Kentucky

Intermission for Review of Exhibits

Diagnostic Clinic: "Use of Iron, Liver Extract and Desiccated Stomach in the Treatment of Anemia"—Dr. Cyrus C Sturgis, professor of internal medicine, University of Michigan School of Medicine, Ann Arbor, Michigan

Diagnostic Clinic: "Is Early Hypertension a Curable Disease?"—Dr. George W Crile, Cleveland Clinic, Cleveland, Ohio

Noon Intermission
1:00 P. M.

Diagnostic Clinic: "Diagnostic Features of Chronic Appendicitis"—Dr. George P. Muller, professor of surgery, Jefferson Medical College, Philadelphia, Pennsylvania

Diagnostic Clinic: "Treatment of Peripheral Vascular Diseases"—Dr. Alton Ochsner, professor of surgery, Tulane University of Louisiana School of Medicine, New Orleans, Louisiana

Address: "The Management and Treatment of Scarlet Fever"—Dr. John A Toomey, associate professor of pediatrics,

Western Reserve University School of Medicine, Cleveland, Ohio.

Address: "Diagnosis of Diseases of the Thyroid Gland"—Dr. Donald Guthrie, associate professor of surgery, University of Pennsylvania Graduate School of Medicine, Sayre, Pennsylvania.

Address: "The Jaundiced Bleeder; Control of Hemorrhage with Special Reference to Vitamin K Therapy"—Dr. Harry P. Smith, professor of pathology, State University of Iowa, Iowa City, Iowa.

SOUTH DAKOTA HEALTH OFFICERS' ASSOCIATION

The South Dakota Health Officers' Association will meet in Huron at the Marvin Hughitt Hotel, October 3, 1939. This is a one day conference only, but an interesting and instructive program is being arranged. This group is really the Public Health Organization of the state, but the name was never available as it previously was used by the South Dakota Christmas Seal and Tuberculosis group. This past year, however, this latter organization adopted the name of South Dakota Tuberculosis Society which now makes available the "South Dakota Public Health Association" for the health officers and public health nurses and workers. A committee has been appointed to study the advisability of the new name and will make its recommendation at the October meeting.

This being the public health group of the state, there is much in common with the State Board of Health and to them most of the morning has been given. Dr. Van Heuvelen, the State Epidemiologist, will discuss the conduct of contagious disease especially in regard to quarantine and follow-up cleaning, now that fumigation is not required. Mr. W. W. Towne, State Sanitary Engineer, is on the morning program as is Dr. J. C. Ohlmacher, Dean of the State Medical School and Director of State Laboratories, to explain the new state set-up of laboratories since the enactment of state laws requiring blood tests for syphilis. In the afternoon a speaker of national prominence is being secured to discuss syphilis control. Dr. W. F. Mengert, associate instructor in obstetrics and gynecology at the University of Iowa, and who in 1936 conducted a state-wide refresher course, will speak on Maternal-Child Welfare, and if time permits there will be papers on an orthopedic subject and on "Contact Infections in Childhood."

The officers of the Association are: President, Will E. Donahoe, M.D., Sioux Falls; vice-president, H. Russel Brown, M.D., Watertown; secretary, J. F. D. Cook, M.D., Superintendent of the State Board of Health, serving out the unexpired term of Dr. B. A. Dyar whose resignation was necessitated by his removal from the state.

REPORT OF THE SOUTH DAKOTA DELEGATE TO THE AMERICAN MEDICAL ASSOCIATION 1939 MEETING*

J. R. Westaby, M.D.
Madison, South Dakota

The American Medical Association held its ninetieth annual session in St. Louis May 15th to 19th, the House of Delegates holding their sessions at the Stattler Hotel on Monday, Tuesday, Wednesday and Thursday.

There were 7,412 members of the Association registered out of a total membership of 113,113. Approximately 250 scientific exhibits were housed in the second floor of the auditorium and 240 technical exhibits on the first floor using all available space in the large building not needed for the section meetings which were well attended.

The second award of the distinguished service medal, which, last year was bestowed on Dr. Rudolph Metas, of New Orleans, was bestowed upon Dr. James B. Herrick of Chicago because of his outstanding contributions to the knowledge of coronary thrombosis.

Dr. Irvin Abell laid special stress in his address upon the stand taken by the American Medical Association in its special session at Chicago last September and the recommendations of the delegates to the committee on medical care for the participation of the Federal Government in Health activities. His address might be summarized in a single quotation:

"Expansion of public health, maternal and child welfare services with limitations of curative measures to private practice where available; utilization of vacant beds in present hospitals on a per diem basis; the construction of new beds and diagnostic health centers on a basis of economic, geographic and health needs with standards for hospital administration for professional personnel; perpetuation of hospital and health centers; the formulation of plans for the care of the medically needy, determined by local and state supervision; the approval of sickness compensation and of voluntary insurance for hospitals and medical services, and unqualified opposition to the suggestion that the individual states initiate studies and plans for their people on a tax paid basis."

Regarding the indictment of the American Medical Association, Dr. Abell advocated fighting the issue to the Supreme Court if necessary, so that the Association and the public may know where we stand. The American Medical Association favors:

(a) The health of the impoverished persons should be protected by the government.

(b) A department of health should be established with a physician as a cabinet member.

(c) Public health, maternal and child welfare services should be expanded.

(d) Better use should be made of the existing hospital facilities and more hospitals should be built only where there is actual necessity for them.

(e) Although compulsory health insurance is undesirable, hospital and cash indemnity insurance for the payment of doctor bills are all right.

Dr. W. F. Brasch, Rochester, Minnesota, chairman of the Committee to survey the need for medical care, denied in his report that the number of medically needy is anywhere near the 40,000,000 estimated by the various groups of government agencies who claim to have studied the problem. He stated that questionnaires had been sent out to many thousands of doctors and dentists with replies received from 20,199 the analysis of which shows that the figures are more nearly 40,000 than 40,000,000.

The most important business brought before the House of Delegates was that dealing with the Wagner Bill and the National Health Program, pending before Congress. A committee of five was appointed and given ample time to consider every phase of the Bill. At times the capacity of the committee room

*Omitted from the Transactions of the South Dakota State Medical Association meeting, published in the July (1939) Journal-Lancet.

was inadequate to hold the interested representatives of states, hospital groups, dentists, and others who sought to listen or add their advice to the hearing. The committee found that the Bill was incorporating all the proposals of the interdepartmental committee and its technical committee and that there was absence of many of the safeguards to which the House of Delegates had called special attention in 1938. The committee made a most complete report which was adopted by the entire House of Delegates without a dissenting vote and the report will no doubt go down as an epoch-making document, clarifying the principles involved and re-emphasizing the necessity for incorporation, in any proposed legislation, certain essential safeguards to which attention has repeatedly been called.

SUMMARY

1. The Wagner Health Bill does not recognize either the spirit or the text of the resolution adopted by the House of Delegates in September 1938.

2. The House of Delegates cannot approve the methods by which the objectives of the National Health Program are to be obtained.

3. The Wagner Bill does not safeguard in any way the continued existence of the private practitioner who have always brought to the people the benefits of scientific research and treatment.

4. The Wagner Health Bill does not provide for the use of the thousands of vacant beds now available in hundreds of church and community general hospitals.

5. This Bill proposes to make Federal aid for medical care the rule rather than the exception.

6. It does not recognize the need for suitable food, sanitary housing and the improvement of other environmental conditions necessary to the continuous prevention of disease.

7. The Bill does not prescribe methods for determining the nature and extent of the needs for preventive and other medical services for which it proposes allotments of funds.

8. The Bill insidiously promotes the development of a complete system of tax supported medical care.

9. While it provides compensation for loss of wages during illness, it also proposes to provide complete medical service in addition to such compensation.

10. The Wagner Health Bill provides for supreme Federal control; Federal agents are given authority to disapprove plans proposed by the individual states.

11. It is inconsistent with the fundamental principles of medical care established by scientific medical experience and is therefore contrary to the best interests of the American people.

12. The fortunate health conditions which prevail in the United States cannot be disassociated from the prevailing standards and methods of medical practice.

13. No other group or profession have done more for the improvement of the public health, the prevention of disease and the care of the sick than have the medical profession and the American Medical Association.

14. The American Medical Association would fail in its public trust if it neglected to express itself unmistakable and emphatically regarding any threat to the national health and well being. It must, therefore, oppose the Wagner Health Bill.

15. The House of Delegates would urge the development of a mechanism for meeting the needs for expansion of preventive medical services, extension of medical care for the indigent and medically indigent, with local determination of needs and local control of administration, within the philosophy of the American form of government and without damage to the quality of medical service.

16. The fundamental question is how and when a state should be given financial aid by the Federal government out of the resources of the states as a whole, pooled in the Federal Treasury.

17. The bizarre thinking which evolved the system of Federal subsidies sometimes called "Grants-in-aid" is used to induce states to carry on activities suggested frequently in the first instance by officers and employees of the Federal government.

18. The use of Federal subsidies to accomplish such Federally determined activities has invariably involved Federal control.

19. Any state in actual need for the prevention of disease, the promotion of health and the care of the sick, should be able to obtain such aid in a medical emergency without stimulating every other state to seek and accept similar aid, and thus to have imposed on it the burden of Federal control.

20. The mechanism by which this end is to be accomplished, whether through a Federal agency to which any state in the need of Federal financial assistance can apply, or through a new agency created for this purpose or through responsible existing Federal agencies, must be developed by the Executive and the Congress, who are charged with these duties.

21. Such a method would afford to every state an agency to which it might apply for Federal assistance without involving every other state in the Union or the entire government in the transaction.

22. Such a method would not disturb permanently the American concept of democratic government.

The summary of this Bill has been given in some length with the background upon which the American Medical Association through its House of Delegates bases its positive policies with respect to legislation affecting public health.

The Wagner Health Bill is before Congress in the stage of preliminary hearings before its committees and the individual doctors of the nation should heed the advice of the President-elect of the American Medical Association, Dr. Nathan Van Etten in his acceptance speech to the House of Delegates when he said: "Yesterday you adopted a report defining your position in relation to the proposed Wagner Health Bill. It will be of small value, however, unless the whole medical profession of the United States is educated to understand it. The practitioner is potentially one of the most powerful persons in the democracy. If he can be made to see his duty to his country and educate his patients to a realization of the dangers of centralized control of medical practice, your action of yesterday will be sustained. In the name of welfare, gentlemen, the practice of medicine as you know it and as you hoped it would become is to be destroyed. The functions of the most highly educated group of professionals in the world are to be taken over by bureaus operated by adventurous amateurs. The time has come for the concerted action of every doctor in the United States."

Every county and state medical society should see that a resolution is brought before its business session supporting this action of the House of Delegates of the American Medical Association and copies of these resolutions should be sent to Senators and Representatives of the state in Congress, as well as the chairman of the Senate committee on Education and Labor, Senator Elbert D. Thomas of Utah.

The following officers were chosen for the year 1940. President—Rock Sleyster, M.D., Milwaukee, Wisconsin; president-elect—N. B. Van Etten, M.D., New York City; treasurer—H. L. Kretschmer, M.D., Chicago, Illinois; secretary—Olin West, M.D., Chicago, Illinois; speaker of the house of delegates—H. H. Shoulders, M.D., Nashville, Tennessee; vice-speaker—Roy Fouts, M.D., Omaha, Nebraska.

The next session of the American Medical Association is to be held in New York City June 10th to 14th, 1940.

News Items

Dr. Edmund G. Vinje, a native of Hillsboro, North Dakota, is now practicing in Langdon with Dr. V. A. Mulligan.

Dr. A. F. Branton of Willmar has been appointed executive secretary of the Minnesota Hospital association.

Postgraduate medical short courses to be given by the University of Minnesota at the Center for Continuation Study this fall have been announced. The schedule is as follows: September 25-30—Proctology; September 25-30—Urology; October 9-11—University of Minnesota Clinics; October 16-21—Nursing Education; November 6-11—Cardiology. Dr. William A. O'Brien is director of postgraduate medical education.

Dr. J. K. Kutnewsky who practiced in Redfield, South Dakota for the past 55 years has retired.

Members of the Minnesota–Dakota Orthopedic Club will serve for the fourth year as clinicians at the seven fall clinics conducted by the Bureau of Services for Crippled Children of the State Social Security Board. The schedule announced recently follows: Worthington, September 9; Hibbing, September 16; Marshall, September 23; Winona, September 30; Bemidji, October 7; Fergus Falls, October 28; and Mankato, November 18. Coöperating with the bureau are the Minnesota Public Health Association, Gillette State Hospital for Crippled Children, and the Division of Rehabilitation of the State Department of Education. Children under 21 years of age, who are physically handicapped, and whose parents cannot provide proper medical care, are eligible to attend the clinic. A letter of referral is required from the family physician in charge of the case.

Dr. Gilman H. Goehrs, a graduate of the University of Minnesota Medical school, 1937, is now associated with Drs. Goehrs, Rathbun and Ernst at St. Cloud, Minnesota.

The Honorable Harlan J. Bushfield, Governor of South Dakota, has appointed a Basic Science Board as authorized by the 1939 South Dakota Legislature. The members are as follows: J. D. Alway, M.D., Aberdeen; F. E. Burkholder, D. O., Sioux Falls; M. L. Severence, chiropractor, Aberdeen; Wm. H. Waller, Ph.D., professor of Anatomy, University of South Dakota, Vermillion; Gregg M. Evans, professor of Chemistry and physics, Yankton College, Yankton.

Dr. August C. Orr, Bismarck, director of the division of child hygiene in the North Dakota state health department, has resigned his post to take over directorship of a district health department at Newberry, Michigan. A former resident of Rugby, Dr. Orr came to Bismarck in July, 1936 after practicing for two years at Sarles, North Dakota.

The South Dakota state board of health has announced that licenses to practice have been issued to the following physicians who recently took tests at Rapid City: W. R. Giedt, Vermillion; William V. Walsh, St. Paul, Minn.; Rush William Karrer, Deadwood; Louis G. Roucek, Omaha; John P. Jones, Mitchell; James H. Crawford, Watertown; Leonard A. Veranty, Watertown; Maynard W. Eggers, Sioux Falls; T. J. Billion, Sioux Falls; A. G. Hofferkamp, Sanator, and Leonard DePonceau, Midland. The board also admitted to practice, by reciprocity, Lynn E. Lande of Winner.

The eleventh annual Inactive Status Training Course for Medical Department Reservists of the Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, October 8 to 22, 1939. The general plan of former years will be followed. Special work in clinics and hospitals will be offered during the morning hours for those asking special assignments. Presentations of carefully selected subjects in military medicine are scheduled for the morning, afternoon, and evening hours. There will be appropriate sections or special courses for officers of the Dental and Veterinary Corps. All Medical Department Reservists are eligible for enrollment. Approved applicants will be enrolled upon the recommendation of the Surgeon of the Seventh Corps Area or the Surgeon of the Ninth Naval District. Applications should be made at an early date and should be forwarded through the respective Reserve headquarters of the officers concerned.

Dr. H. J. Skarshaug formerly of Fargo has opened an office in Washburn, North Dakota.

Dr. Syver Vinje of Hillsboro, North Dakota, recently observed his 25th anniversary of practice in that community.

Dr. David P. Anderson, Jr., of Philadelphia, has joined the Austin Clinic in Austin, Minnesota. A graduate of the University of Pennsylvania Medical school, 1934, Dr. Anderson has spent the past five years at Philadelphia General hospital specializing in surgery.

Dr. John Paul Jones, a graduate of Northwestern University Medical school, 1938, has become associated with Dr. E. W. Jones in Mitchell, South Dakota.

The new $86,000 municipal hospital at Lake City, Minnesota was opened July 21, 1939.

Dr. Robert W. Merrill, Morris, Minnesota, has purchased the practice of his late associate, Dr. J. F. Cumming of Morris.

Dr. John Arthur Williams, St. Paul, has become associated with his uncle, Dr. L. A. Williams, in the practice of medicine and surgery in Slayton, Minnesota.

Dr. H. E. Hilleboe of Minneapolis has been appointed chief of the medical unit of the social welfare division of the new state department of social security.

Dr. Robert J. Brotchner of Minneapolis has become surgical resident physician at the Northwest clinic and Trinity hospital in Minot, North Dakota.



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Dr. R. R. Hendrickson, St. Cloud, Minnesota, has been named superintendent of Buena Vista sanatorium, Wabasha and Winona county institution. He succeeds Dr. Russell H. Frost who resigned to become head of the Cooley sanatorium at Monroe, Louisiana.

The 24th annual homecoming of Nopeming sanatorium, Duluth, Minnesota, was held August 15. Honored guests included former patients and members of the sanatorium staff. An exhibition of handicraft products of the workshop was one of the program features.

Dr. Raymond B. Allen, dean of the Wayne university college of medicine in Detroit since 1936, has been appointed executive dean of the University of Illinois colleges of medicine, dentistry and pharmacy. Dr. Allen received his Ph.D. in urology from the University of Minnesota in 1934 after he completed his work as a fellow in the Mayo Foundation. After leaving Rochester, he was associate dean in charge of graduate studies, faculty of medicine, Columbia university, and associate director of the New York Postgraduate Medical school, Columbia university.

Dr. R. S. Mitchell of Grand Meadow, Minnesota, was recently honored by that community on the occasion of his completion of thirty-five years of medical practice.

Our attention has been called to the fact that a young man representing himself as a medical student and giving the name of Chester Wainwright, has been soliciting subscriptions from physicians to a publication called *College Years*. He states that the magazine is being sponsored by the Circulation Associates, headed by Walter Camp, son of the famous football coach. He claims he is a graduate of Phillips Academy and of Harvard and that if he receives a number of subscriptions he will be entitled to finish his medical education in any school he selects.

The Phillips Academy, when questioned about the young man, replied that "we do not believe that Chester Wainwright ever attended Phillips Academy. Our records do not contain his name nor do any of us remember him. From time to time inquiries come to us from different parts of the country stating that Mr. Wainwright claims to be a graduate of Phillips Academy. There is no graduate by that name on our books. The inquiries always refer to solicitations for financial assistance. It would seem that the man is an impostor."

The young man, about 20 years of age, is 5 feet, 10 inches tall and is quite thin. He has pointed features, prominent ears. Attired in college dress, polo shirt, etc., he carries a certificate bearing his picture.

ATTENTION SECRETARIES OF DISTRICT SOCIETIES

Space is at your disposal in The Journal-Lancet for advance notices and reports of meetings of your society and personal news items concerning members of your society. County and district secretaries are invited to forward such material to The Journal-Lancet, 84 S. 10th St., Minneapolis.

Necrology

Dr. John A. Evert, 55, of Glendive, Montana, died August 17, 1939. Dr. Evert was chief surgeon of the Northern Pacific Benefit association hospital.

Dr. John A. Donovan, 67, of Butte, Montana, died July 21, 1939. He had practiced in Butte for 40 years.

Dr. J. M. Allen, 72, of Rosholt, South Dakota, died in Breckenridge, Minnesota, August 8, 1939. He had been a practicing physician for the past 38 years at White Rock and Rosholt, South Dakota.

Dr. Wayne P. O'Brien, chief surgeon at the federal veterans' hospital at Hot Springs, South Dakota, died July 26, 1939. He had been associated with the hospital for the past 11 years.

Dr. F. E. Salvage, 73, of LaMoure, North Dakota, *died July 14, 1939.*

Dr. Harold Rypins, 49, of Albany, New York, a University of Minnesota graduate and secretary of the New York state board of medical examiners, died recently.

Dr. Theodore Thordarson, 76, practicing physician of Minneota, Minnesota, since 1895, died August 1, 1939.

Dr. K. O. E. Heimark, 66, of Duluth, Minnesota, died July 17, 1939.

Dr. John F. Cumming, 41, of Morris, Minnesota, died July 12, 1939.

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Chairman, Program Committee, Dr George W Crile — Treasurer and Director of Foundation Fund, Dr Henry G Langworthy
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W. Wayne Babcock, Philadelphia, Pa
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Herman L Kretschmer, Chicago, Ill
Frank H. Lahey, Boston, Mass
Philip Lewin, Chicago, Ill
William E. Lower, Cleveland, Ohio
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Ross T. McIntire, Washington, D C
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Harry Mock, Chicago, Ill
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A program will be mailed to every member of the medical profession in good standing in the United States and Canada on or about September 1.

If any member of the profession in good standing does not receive a program, please write the Managing Director at once and a copy will be mailed

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Whereas the infant incubator exhibit strikes the one serious note in the Amusement Area, the medical exhibits in the major exhibit area, often presented in a light vein, constantly entertain, yet edify, visitors. Exhibits in the Medicine Building are partitioned off into the Hall of Man which focuses attention on human physiology in an unique fashion, and the Hall of Medical Science, where more than a score of exhibitors bring up to date the gamut of Man's salient accomplishments in the field of medicine.

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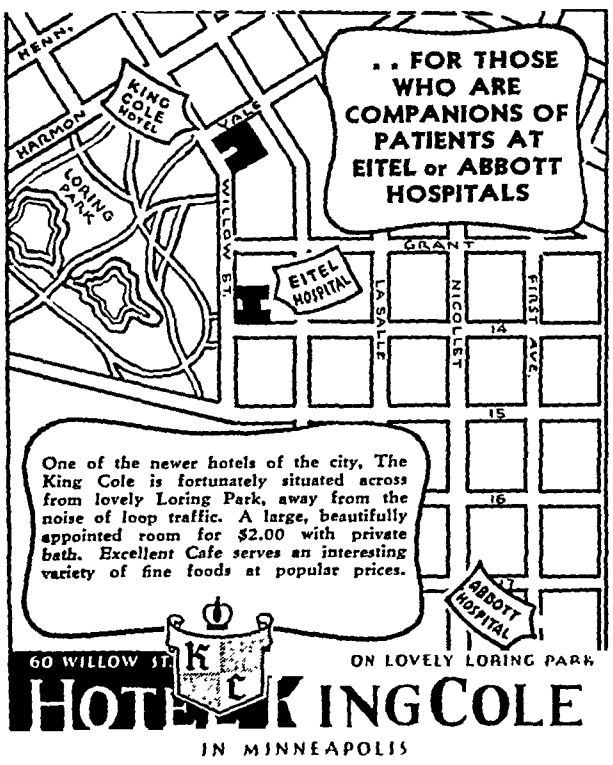
GOLF, AND INFANT FEEDING

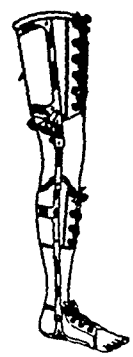
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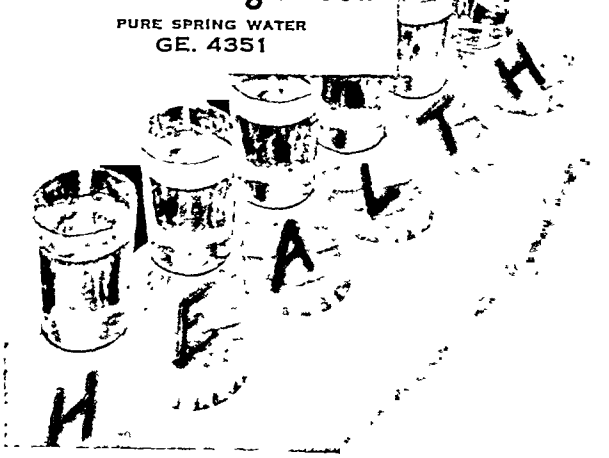
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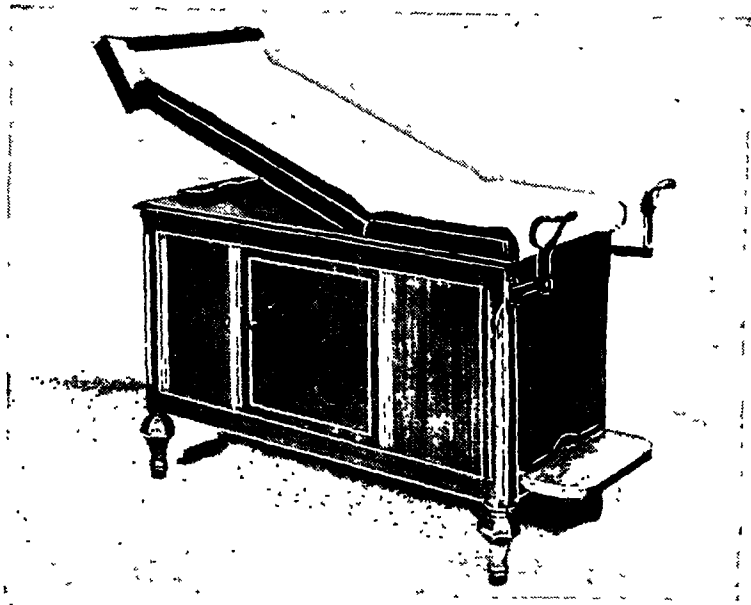
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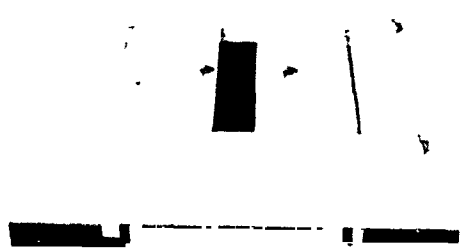
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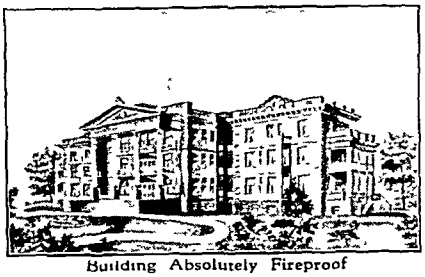
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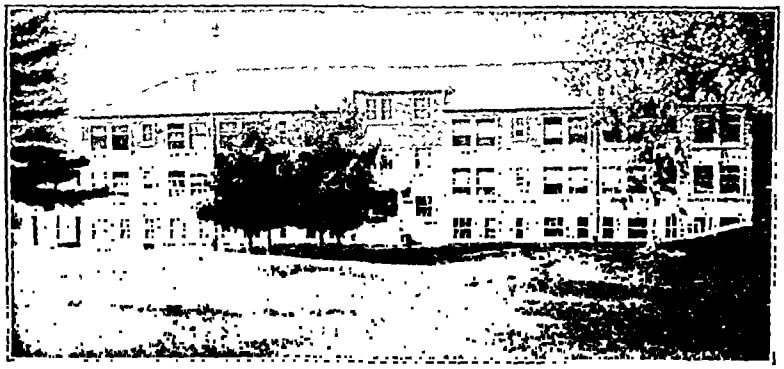
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This is often a cause of headaches, *weight disturbances, and emotional* outbursts. During adolescence, heart and lungs need watching. At this time, tuberculosis, anemia, and appendicitis become greater hazards.

The doctor can not only help remedy "the troubles of the teens," but if *the child is brought to him early, he* can often forestall them. He can correct any organic weakness.

Under the physician's sympathetic direction, adolescence is usually a happier prelude to healthy, happy womanhood.

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July, 1939

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1—collect sputum for typing;

2—take specimens for blood culture and blood count;

3—then begin administration of Sulfapyridine;

But give serum also:

—if patient's temperature, pulse rate and respiration are not essentially normal within 24-36 hours after beginning the drug treatment,

—or if the case is of 3 days' or more duration;

—or if bacteremia is present;

—or if the patient is over 40;

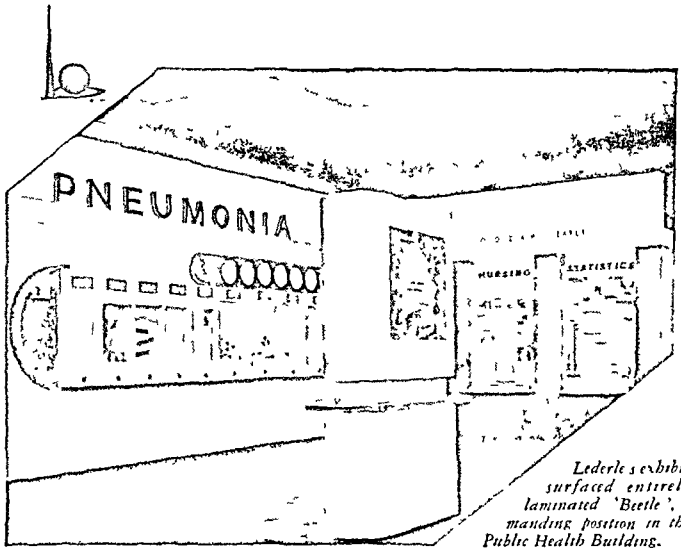
—or if two or more lobes are involved,

—or if patient is pregnant or in first week of puerperium;

—or if, on account of nausea, patient cannot tolerate *Sulfapyridine.*

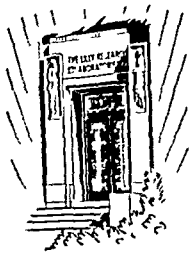
Finally, watch for contraindications for Sulfapyridine: this requires daily blood counts and urine analyses. Sulfapyridine is toxic to some and patients should be constantly supervised to detect a possible occurrence of hemolytic anemia, hematuria, or leukopenia. Nausea, the most constant side-effect, is not a contraindication.

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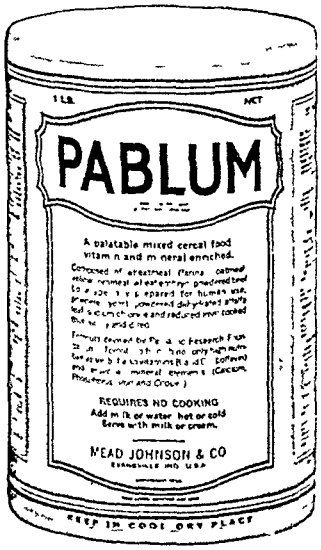
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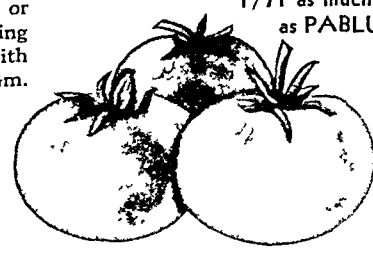
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	Mg per Oz	
	Iron	Calcium
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Carrots	0.17	13.1
Peas	0.50	8.0
Spinach	1.13	21.8
String Beans	0.27	14.2
Tomatoes	0.12	3.1

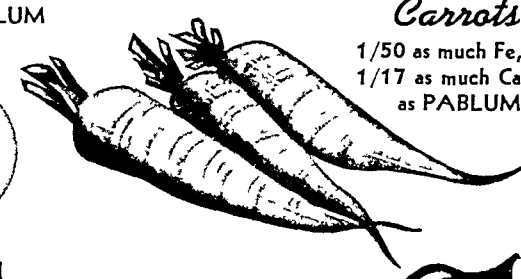
Peas
1/17 as much Fe,
1/27 as much Ca
as PABLUM



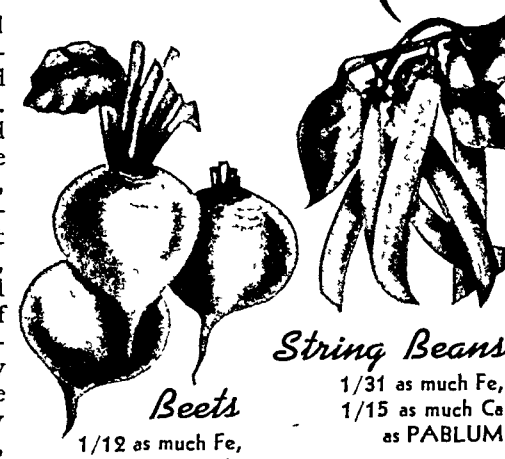
Tomatoes
1/70 as much Fe,
1/71 as much Ca
as PABLUM



Carrots
1/50 as much Fe,
1/17 as much Ca
as PABLUM



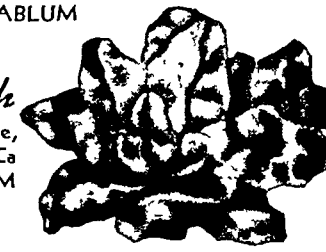
NOT only does Pablum have a higher iron and calcium content than vegetables but, most important, clinical studies of children have demonstrated that in Pablum these minerals are in available form. Investigations by Stearns and Stinger, Schlutz, and Cowgill show that even such an iron-rich vegetable as spinach did not increase iron storage in the body, in fact, caused a loss in some instances. A factor responsible for this difference may be the higher content of *soluble* iron in Pablum—7.8 mg. per oz. Then, too, the water in which Pablum is cooked (by a patented process) is dried with it, whereas the cooking water of vegetables is usually discarded, with its valuable content of minerals and vitamins. Stearns reports difficulty in feeding spinach in sufficient quantities to affect the iron balance of children. Spinach and other highly flavored vegetables are often difficult to feed. Pablum, on the other hand, is a palatable cereal that can be fed as early as the third month, and for older children it can be varied in dozens of appetizing dishes. Recipes and samples available on request of physicians.



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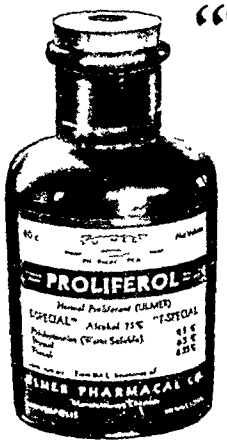
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ADM NUTRITION REVIEWS

VOL. 1 JULY, 1939 NO. 1

Hay Fever and Wheat Germ Oil

It has been amply confirmed that the need of experimental animals (rats) is not for fat in general but for certain specific unsaturated fatty acids which are contained in quite variable amounts in some oils and are lacking in others. These fatty acids can be regarded as indispensable for mammals, insofar as the rat typifies mammals, and have assumed a position similar to that of certain amino acids, vitamins and minerals as an essential constituent of a complete diet. (1)

Not all unsaturated fatty acids are capable of correcting the "fat deficiency" syndrome. Nor is the final chemical identity of the effective acid yet known. It has been thought that linoleic and linolenic acids, found characteristically in linseed oil, represented the active ingredients; but the opinion is now gaining ground that some form of either linoleic or linolenic acid is necessary from which the bodily organism can produce arachidonic acid which is much more effective than either linoleic or linolenic derivatives (2).

Some authors and investigators suggested the use of the term vitamin F for the unidentified substance or substance responsible for the prevention of fat deficiency symptoms (3). This term has been used interchangeably with "essential unsaturated fatty acids." It was later suggested that the name vitamin F be dropped in favor of linoleic or linolenic acid. However, if the facts as they are now known remain unaltered, then vitamin F will be synonymous with arachidonic acid, and the term pro-vitamin F would more fittingly describe linoleic and linolenic acids; that is, linoleic and linolenic acids are to arachidonic acid what carotin is to vitamin A. When the confusion in the nomenclature subsides, there will emerge the realization that by whatever name it is known, a substance exists which must be supplied to the living animal for the prevention and cure of a characteristic series of symptoms collectively known as the fat deficiency syndrome.

FAT DEFICIENCY SYNDROME

As described by numerous experimenters, the fat-deficiency syndrome is variously manifested. Burr, and his followers (4) (5) (6) (7) (8) described symptoms which can conveniently be grouped in this fashion:

Epidermal

1. Scaly skin, analogous to allergic eczema in the human.
2. Marked swelling analogous to angioneurotic edema.
3. Abundant dandruff, analogous to seborrheic dermatitis.
4. Alopecia, such as may follow seborrheic dermatitis.

Visceral

1. Hematuria.
2. Albuminuria.
3. Renal Lesions.

Endocrine

1. Probable pituitary disorder suggested by marked water intake without corresponding increase in food intake.
2. Disinclination to want to mate.
3. Irregular ovulation.
4. Sterility.

Systemic

1. Inanition.
2. Inhibited Growth.
3. Anorexia.

Of these symptoms, it is difficult to escape noticing the striking suggestion that the epidermal manifestations resemble those frequently associated with allergic states,—eczema, angioneurotic edema, seborrheic dermatitis.

Hansen and Burr (9) and Hansen (10) (11) (12) early pointed out that the deficiency syndrome in animals in many respects simulated infantile eczema. Hansen reported that infants in the acute phase of infantile eczema have a lowered unsaturated fatty acid content in the blood. He stated that oils carrying effective unsaturated fatty acids (more succinctly vitamin F), corrected the skin lesions at the same time that the blood assumed a more normal level of the fatty acids. Hansen and Burr worked on the iodine absorption of rat serum on animals fed a fat-free diet and with this wholly inadequate measure of vitamin F concentration nevertheless reached the conclusion that the blood levels of the essential fatty acids fluctuated with the variations in the diet intake of these indispensable factors.

Cornbleet and Pace (13), using corn oil as a source of unsaturated fatty acids, noted that over a period of four and a half years a group of eighty-seven patients with chronic eczema responded to the treatment. The eczema in the cases

studied was the condition referred to as allergic eczema, exudative and dietetic eczema, Bernier's prurigo or generalized neurodermatitis. Some of these cases not only had eczema, but at the same time also had bronchial asthma or hay fever. As the eczema responded to vitamin F treatment, the bronchial asthma or the hay fever also responded.

In the Cornbleet series of cases it was observed that most of the eczema cases were in individuals who either had a predisposition to or came from a family with tendency toward hay fever or bronchial asthma. This association of clinical conditions is not uncommon and it is frequently the case that hay fever or bronchial asthma in later life is preceded by eczema in earlier years, and the reverse.

Oncken ([14]) mentioned the studies of Achard, Grigaut, LeBlanc and David ([15]) who studied the relation between infections and blood cholesterol. These investigators reported that in infectious fevers, the blood cholesterol value first falls, then, on convalescence, it rises to values which may even exceed normal. The iodine number, or gross measure of total unsaturated fatty acids, similarly falls at the beginning of acute infections and likewise returns to normal as convalescence develops. It is recognized that the iodine value of a fatty material expresses its degree of unsaturate content, high iodine value expressing much and low iodine value expressing little unsaturated fatty acids. Thus, in infectious onsets, it is possible that Achard's work suggests the inability on the part of the liver to desaturate more highly saturated acids ([16]). Translated to terms of vitamin F, this could imply that when infections are precipitated the liver loses its ability completely or in part to convert provitamin F to vitamin F (linoleic acid to arachidonic acid).

On this hypothesis, Oncken prevented "snuffles" in experimental rats by administering oils rich in unsaturates (vitamin F).

VITAMIN F AND HEAD COLDS

Boyd and Connell ([17]) jointly studied the clinical prevention of the common head cold with vitamin F preparations. The preparation designated vitamin F used in the clinical investigation of these clinicians comprised the unsaturated fatty acids derived from linseed oil and represented a somewhat purified concentrated mixture of linoleic and linolenic acids containing also some arachidonic acid. For convenience in administration the material furnished was used in perles each containing 3-minims of the socalled vitamin F concentrate. Boyd and Connell decided to administer 15 minims, or five perles containing 3-minims each as an arbitrary daily dose, preliminary trials indicating that this amount was well tolerated. There was no variation in the daily dose throughout the course of the experiment. At first some of the subjects reported nausea and vomiting when the perles were taken on an empty stomach. These subjects were advised to take the medication with meals following which the unpleasant reaction no longer appeared. From the data of Brown and Hansen ([18]) and that furnished by Boyd ([19]) it was calculated that the daily 15 minim dose corresponded roughly to one-half of the total amount of linoleic and arachidonic acids present in the entire blood plasma of a normal man.

One hundred and six young men, mostly medical students, cooperated in the Boyd and Connell investigation. They were divided into two groups, those who stated that they were susceptible to colds and those who were not. As was expected by the investigators, a few men were inadvertently included in the wrong group. There were 41 men who said they were subject to many and severe colds each winter, and 65 who noted that they were relatively free of colds. A period of seven weeks, beginning January 1, 1937, was chosen to determine the frequency and duration of colds in each group without treatment with vitamin F. During this initial period, the 41 cold susceptibles had a total of 63 colds which lasted a total of 454 days. The average number of colds per man in this group during this time was 1.54 and the average duration was 11.1 days. At the same time, the group of 65 men who were relatively free of colds had a total of 53 colds lasting a total of 248 days or an average of 0.82 colds per man lasting 3.8 days.

During the second period of seven weeks each man in the first group was given 15 minims daily of the vitamin F preparation, and no vitamin F was given to the men in the control group. During the period of treatment with vitamin F, the total number of colds in the susceptible group fell to 23 and the average number of colds per man to 0.56. Since in both instances a period of seven weeks was used, the authors concluded that there was a decrease of 64 per cent in the number of colds in the cold-susceptible group, a decrease which in view of the changes in the control group may be concluded to have been due to the vitamin. In the control group at the same time there was less change in the incidence of colds. The total number of colds during the second period of seven weeks was 41, or 0.63 colds per man. From January to March, therefore, the number of colds in the non-susceptible group dropped an average of but 22 per cent. The authors concluded that it appeared that the use of vitamin F resulted in the significant lowering of the incidence of colds. They also suggested that perhaps the incidence of colds that could not be lowered further by the use of vitamin F might be ascribed

to factors other than vitamin F deficiency as responsible for the condition.

Even more impressive were the effects of vitamin F upon the duration of the cold. In the untreated cases the colds lasted on an average as long as they did originally, or in the first period of the observation,—that is, an average of 3.8 days. Contrariwise, in the treated group the average duration fell from 11.1 days in the initial period before treatment to 2.5 days during the vitamin F treatment in the second period,—a decrease of 78 per cent in the average duration time.

Boyd and Connell summarized the observation of these experiments as follows: "Following a control period of seven weeks, beginning January 1, during which colds were recorded, 15 minims of purified linoleic and linolenic acids ("vitamin F") were given daily to 41 medical students for a further seven weeks, and 65 others served as controls. Vitamin F reduced the average incidence of colds by 64 per cent and the average duration by 78 per cent, there being at the same time little appreciable differences in the incidence and duration of the untreated group. Of the treated group, 71 per cent responded favorably, and 29 per cent showed no relief. Unpleasant reactions occurred in one-third of the treated cases, diarrhoea, nausea and vomiting being the chief side effects, but most of these were temporary and disappeared on taking the substance with, rather than between, meals."

WHEAT GERM OIL VERY RICH SOURCE OF VITAMIN F

Turpeinen ([20]) compared various vitamin F sources and found wheat germ oil to be exceptionally active in this respect. It excels by nearly three times oils, such as linseed, which had previously been thought to be rich sources of this ingredient. Empirically, wheat germ oil has been used by workers at Northwestern University and others elsewhere for the correction of hay fever. Precisely what is contained in wheat germ oil that is seemingly responsible for the beneficial results reported in this use has not yet been evaluated; but it may be tentatively postulated that undoubtedly the most practical explanation for the time being is to ascribe the effectiveness of the oil in these cases to its unusually large vitamin F content. It has not been shown that the vitamin E content of wheat germ oil does or does not play a part in the phenomenon.

The clinical tests of the Northwestern workers have been going on for some years. The oil was administered at first in doses of approximately a third of an ounce per person per day. Since wheat germ oil is approximately three times as effective in its vitamin F content as is linseed oil, it appears that a rather considerable amount of vitamin F is necessary to accomplish whatever results is obtained in the treatment of hay fever cases. Naturally, this suggests that not only can vitamin F deficiency exist, but that it can exist in such pronounced degrees as to require unusually large quantities of unsaturated fatty acids to effect a correction.

In this connection, however, it should be pointed out that Shute ([21]) ([22]) ([23]) ([24]) has emphasized the necessity for giving very large initial doses of wheat germ oil in the correction of those sterility disorders and pregnancy disorders ascribable to vitamin E deficiency. The usual small doses of wheat germ oil were found by Shute to be entirely ineffective in these cases and had to be supplemented with large or saturation quantities of the material. Shute has frequently prescribed as high as 24 drams of wheat germ oil in a single day to effect this saturation, although more usually he recommends from 6 to 12 drams of wheat germ oil at a single daily dose. These large doses, whether used for their vitamin F effects in the treatment of hay fever or whether used for the treatment and prevention of pregnancy complications and disorders, clearly indicate that rather profound vitamin E and vitamin F deficiency can exist such that the usual quantities of oil heretofore employed may be entirely ineffective in establishing a remedy.

More recently, the dosage of wheat germ oil for the treatment of hay fever has been fixed at four teaspoonsful of wheat germ oil per day. This treatment appears to have originated at the Northwestern University Medical School in consequence of some studies that were being carried on there in connection with anaphylaxis. According to one of the principals, the treatment has had three seasons of trial in various allergic states and approximately a year ago it was thought to have given merit in about one-half of the sufferers. The investigators have not published the results of their experimentation and apparently do not intend to do so until such time as they have produced substantial evidence beyond any possibility of controversy ([25]).

SUMMARY

1. The fat-deficiency syndrome is now established on amply sufficient scientific evidence to permit of its acceptance. It postulates that fats are not necessary for the diet in themselves but because certain fats, and not others, contain either pro-vitam F or vitamin F substances.
2. It would appear that the pro-vitam F substances include linoleic and linolenic acids and their various esters, such as the methyl ester. These substances are seemingly con-

verted into more highly unsaturated fatty acids, particularly arachidonic, in the liver of the living organism.

3. Pro-vitamin F material becomes vitamin F material just as pro-vitamin A becomes vitamin A under the action of certain physiologic processes in the liver.

4. Inability on the part of the liver to produce vitamin F material from its pro-vitamin precursors develops a fat-deficiency syndrome which in some of its forms expresses itself in clinical symptoms that have been associated with allergic manifestations. Seemingly, these have included allergic eczema, allergic seborrheic dermatitis, and less definitely but quite suggestively, hay fever.

5. Wheat germ oil, commonly known for its unusual richness in vitamin E has been shown to be especially rich also in vitamin F activities. In this respect it seems to exceed in value any other known vegetable oil.

6. Empirically, for some three years or longer, wheat germ oil has been given in large doses for the correction of certain allergic manifestations with the report that approximately 50 per cent of patients receiving the treatment are benefited.

7. At the present time seemingly the best responses to wheat germ oil in allergic manifestations are secured when four teaspoonsful of wheat germ oil are given daily to the patient. This corresponds to very nearly an ounce of wheat germ oil a day and represents a large, saturation dose. In this respect, the necessity for large doses of wheat germ oil are in keeping with the finding reported by Shute that pregnancy complications ascribable to vitamin E deficiency are frequently not relieved unless large or saturation doses of wheat germ oil are furnished.

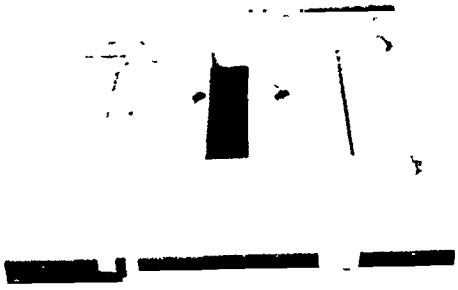
8. Such common head colds as may perhaps be included in the category of allergic manifestations resembling in some of their symptoms hyperesthetic rhinitis and the prodromal symptoms to any beginning rose fever, have been clinically treated with vitamin F preparations with clinical report that the incidence of such head colds has been lessened and the average duration of the cold has been materially decreased through vitamin F.

9. Likewise, wheat germ oil, presumably for its pro-vitamin F and vitamin F content has found acceptable application in the empiric treatment of hay fever as an allergic expression in daily doses of four teaspoonsful begun preferably two or three weeks in anticipation of a scheduled attack.

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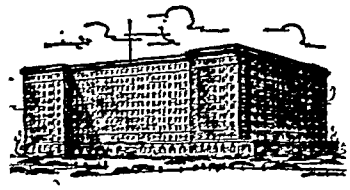
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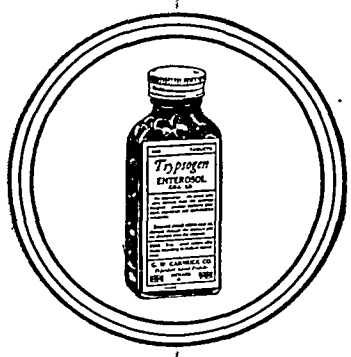
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ANNUAL MEETING OF THE COUNCIL OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

First Meeting of the Council

Monday, April 24, 1939—10:00 A. M.

The Council was called to order by Dr. S. M. Hohf, Chairman, at 10:00 a. m., Monday, April 24, 1939, at the Alonzo Ward Hotel, Aberdeen, South Dakota.

Roll Call: Drs. J. C. Shirley, C. E. Sherwood, B. A. Dyar, J. R. Westaby, J. D. Whiteside, W. G. Magee, D. S. Baughman, B. M. Hart, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, R. B. Fleeger, C. E. Lowe, Wm. Duncan, and E. A. Pittenger. Quorum present.

The Secretary presented for approval the minutes of the 1938 annual meeting as printed in the July 1938 JOURNAL-LANCET; also the minutes of Council meetings held June 17, July 13, September 12, November 29, January 18, and February 14. Minutes were approved.

The report of the Secretary-Treasurer was given by Dr. Sherwood. It was moved by Dr. Duncan and seconded by Dr. Fleeger that the report be accepted and submitted to the Auditing Committee. Motion passed.

The report of the Committee on Arrangements was submitted by Dr. Sherwood. Dr. Shirley moved that the report of this Committee be accepted and placed on file. Motion seconded and passed.

The report of the Executive Secretary was given by Dr. Dyar. Dr. Dyar first reported on the payment of services for care supplied old age assistance recipients. He stated that according to the Social Security Law, the money allocated for medical care must go directly to the client. This has not worked out satisfactorily for in many instances after the client has received medical service and received money to pay the doctor, he does not always use the money for that purpose. Some plan should be worked out whereby the doctor can be assured of receiving compensation for rendering service to old age assistance recipients. Each old age assistance recipient is allowed a maximum of $12 a year for medical care. Dr. Dyar next reported on the medical relief program and presented Council members with a statistical study covering the first five months of the present program. It was brought out that the program had not worked out successfully because of inadequate supervision, misunderstanding on the part of the Farmers Aid Corporation members and also the professional people participating, concerning the limitations of the program, and lastly, insufficient funds. Dr. Dyar stressed the necessity of the doctors formulating a plan of medical relief which they found desirable, providing they wished to endorse a plan, and submitting it to the Inter-Allied Council for consideration. If such plan is found satisfactory, it will be submitted to the officials of the Farm Security Administration for final action. Dr. Dyar asked to be relieved of the duties of Executive Secretary of the State Medical Association.

Old Business. A letter was read by Dr. Sherwood from the Vermillion District Medical Society concerning the matter of Dr. L. A. Haug's membership in that District Medical Society. This matter was discussed. It was moved by Dr. Pittenger and seconded by Dr. Whiteside that the 8th District Medical Society be reimbursed for the membership fee paid by Dr. Haug who has not been elected to membership in the State Medical Society, less the amount of the subscription to the JOURNAL-LANCET. *Motion carried.*

A letter was read by Dr. Sherwood from the Mitchell District Medical Society concerning a tonsil clinic advertised by Dr. R. P. Frink of Wessington Springs. It was moved by Dr. Westaby and seconded by Dr. Pittenger that this matter be referred back to the Mitchell District Medical Society for action. *Motion carried.*

New Business. The matter of redistricting the medical societies of the State was presented by Dr. Sherwood. A discussion was held. It was moved by Dr. Magee and seconded by Dr. Duncan that the medical societies be redistricted as presented by the Secretary. *Motion carried.*

The matter of doctors living in border states and practicing in South Dakota was discussed.

Dr. Sherwood presented a budget for next year in accordance to the by-laws of the State Medical Association. It was moved by Dr. Hart and seconded by Dr. Magee that the proposed budget be laid on the table until the next meeting of the Council. *Motion carried.*

Mr. Cohen, representing the JOURNAL-LANCET appeared before the Councilors and took up the matter of subscription rates of the JOURNAL-LANCET. It was moved by Dr. Magee and seconded by Dr. Fleeger that the subscription to the JOURNAL-LANCET for the coming year be raised from $1.50 to $1.75 and the price thereafter will be $2.00 per year. *Motion carried.*

The chairman appointed the following doctors to serve on the Auditing Committee: Drs. Magee, Duncan, and Baughman.

Meeting adjourned.

CLARENCE E. SHERWOOD, M.D.,
Secretary.

Report of Secretary-Treasurer
April 22, 1939

May 7, 1938, Balance on Hand	$1,976.89
Receipts—	
Back dues received for 1938	482.00
Huron Exhibit Profits	65.93
Trust Certificate, Langford State Bank No. 375	183.98
1939 dues at $10.00—231 members	2,310.00
	$5,018.80
Disbursements—	
Marvin Hughitt Hotel Guests	$ 71.24
Expenses Railroad for Speakers	143.90
Bank Exchange and float charge	1.25
Printing and Supplies	111.20
Salary Executive Secretary	600.00
Salary Secretary-Treasurer	600.00
Expenses Secretary-Treasurer, Travel	19.37
Telephone Toll	46.67
Badges State Meeting 1939	18.59
Programs State Meeting 1939	55.45
Postage	97.96
Bond Secretary-Treasurer	5.00
JOURNAL-LANCET Subscriptions	657.75
Council Dinner	24.73
Delegate A. M. A. Expense	143.00
Inter-Allied Council	50.00
Miscellaneous	26.50
	$2,672.61
Balance on Hand April 22, 1939	$2,346.19

Legislative Fund

	Expenditures
Karl Goldsmith	$1,166.83
Postage	38.46
Council	292.36
Telephone and Telegraph	348.02
Printing	138.81
Miscellaneous	102.65
Total	$2,087.13

District	Receipts	Expenditures
1	$ 357.50	$ 115.02
2	80.00	
3	270.00	43.22
4	225.00	9.02
5	55.00	30.00
6	332.00	109.22
7	254.00	50.60
8	471.84	50.00
9	335.00	10.84
10	50.00	
11		
12	187.50	59.43
Central Office, Madison		1,609.78
	$2,617.84	$2,087.13

Balance on Hand April 22, 1939 $530.71

Membership by Districts
April 22, 1939

Aberdeen District Number 1	31
Watertown District Number 2	21
Madison District Number 3	22
Pierre District Number 4	12
Huron District Number 5	14
Mitchell District Number 6	22
Sioux Falls District Number 7	44
Yankton District Number 8	31
Black Hills District Number 9	20
Rosebud District Number 10	6
Northwest District Number 11	8
Whetstone Valley District Number 12	
Members	231
Honorary Members	10
Total	241

Total Number of Doctors in state 562
Number of Doctors deceased during year 10

CLARENCE E. SHERWOOD, M.D.,
Secretary-Treasurer.

Second Meeting of the Council
Wednesday, April 26, 1939—7:00 A. M.

The second meeting of the Council was held at 7:00 a. m., Wednesday, April 26, 1939. Chairman, Dr. S. M. Hohf, presiding.

Roll Call: Drs. J. C. Shirley, C. E. Sherwood, B. A. Dyar, J. D. Whiteside, W. G. Magee, C. E. Lowe, D. S. Baughman, B. M. Hart, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, R. B. Fleeger, J. R. Westaby. Quorum present.

The report of the auditing committee was given. It was moved and seconded that this report be accepted. *Motion carried.*

Legislative matters as they applied to the State Medical Association and the medical profession in the State were discussed.

Dr. Magee moved that the money collected for the special legislative fund be put into a special fund and so remain for future legislative needs and an effort be made to collect the money assessed each District of the Medical Association for this purpose which has not been previously paid, to be added to the special fund. *Motion seconded and carried.*

Dr. Baughman moved that the State Medical Association try to retain Karl Goldsmith as its legal advisor at an annual regular retainer and that a committee contact Mr. Goldsmith and report their results together with the retainer that he may request to the officers of the State Medical Society. *Motion seconded and carried.*

Dr. Riggs was appointed chairman of this committee.

The matter of continuing the office of Executive Secretary was thoroughly discussed.

Dr. Donahoe moved that Dr. Dyar's resignation be accepted and that the duties of the office be carried on by the Secretary of the State Association, and the office of Executive Secretary be declared vacant for the time being. Motion seconded by Dr. Lloyd and carried.

Dr. Baughman moved that the State Medical Association turn the Executive Secretary's salary over to Dr. Sherwood for the time being for carrying on the duties that were previously performed by the Executive Secretary. Motion seconded by Dr. Lowe and passed.

Dr. Riggs, chairman of the committee to draft a new medical relief program, reported on the plan agreed upon by the committee. Some recommended changes were made. The report is as follows:

The following is a proposed outline of a plan submitted to the Council of the State Medical Association by the undersigned committee appointed by the President of the State Medical Association which met with the approval of the Council. This plan is being presented to the Inter-Allied Council for consideration and completion of necessary details. The plan will then be submitted to the board of directors of the Farmers Aid Corporation for final action.

We, the undersigned members of your committee appointed by the President of the State Medical Association for the *study and organization of a new setup for the emergency care* of the needy clients of the Farm Security Administration take leave to report as follows:

1. History of the attempt to provide medical care for clients of the Farm Security Administration:

The Inter-Allied Professional Council held its first meeting September 3, 1935, in Huron. At that time the question of medical relief was not under consideration.

On August 23, 1936, at Rapid City, the first meeting of the Inter-Allied Council relative to medical relief was held at the Alex Johnson Hotel. At this meeting Dr. R. C. Williams, Medical Director of the Resettlement Administration of Washington, was present and was informed of the situation as it existed among the five professions at that time. This meeting was held merely to acquaint Dr. Williams with the situation as it applied to the professions of the Inter-Allied Council. He was assured that a medical relief plan would have to be worked out after adequate data had been secured and the plan submitted to the Resettlement officials in Washington for their point of view.

The next meeting was held at Huron, October 20, 1936. At this time Dr. Williams briefly explained the plan of organization. After discussion, the relief setup was endorsed for one year.

On December 10, 1936, the Inter-Allied Council met in Huron and was informed that the relief program as worked out by Dr. Williams of Washington in connection with the various allied groups had been accepted by the State Medical Association and put into effect for the period of one year.

On November 3, 1937, at a meeting, Dr. Williams set forth the principles of a new plan proposed to take care of all members of the Farm Security Administration in the state. Mr. Cal Ward, Regional Director of the Farm Security Administration, was also present and explained the work of the funds available for this program and stressed the need of the Councilors to formulate a plan which would adequately provide for relief through the winter. At this meeting, the following resolution was presented to the Inter-Allied Council by the Council of the State Medical Association: "It is the sense of this Council that in the emergency medical care of clients of the Farm Security Administration we accept the plan of prorating the cost between the physicians, dentists, druggists, hospitals and other expenses according to the average expense of the North Dakota Farmers Aid Corporation in that State." This resolution was adopted by the Inter-Allied Council.

On March 16, 1938, the money available for the operating of the Farmers Aid Corporation program was discussed and divided as follows: Physicians to receive 51 per cent, hospitals 39 per cent, dentists 6 per cent, druggists 3 per cent and nurses 1 per cent. This proportion was not found satisfactory and was changed later so that the hospitals received a little larger percent than these figures show. This setup stayed in force until June 30, 1938, and from then until November 1, 1938, the professions were on their own.

On September 12, 1938, the Inter-Allied Council met and discussed plans for the present setup that went into operation November 1, 1938.

The funds necessary to conduct these setups were secured from the Farm Security Administration and it demanded that a legally organized corporation under the laws of South Dakota be organized to handle the money, this organization to be known as the Farmers Aid Corporation. The directors of this Corporation were required to be two representatives of the Farm Security Administration, two officers of the State Welfare Board and the Medical Director of the Farm Security Administration who was loaned to the Farm Security Administration by the United States Public Health Service. The funds which come into this organization and are distributed by it must be repaid, if possible, to the government through the same organization which paid the money into the organization, technically organized in the form of a private corporation. It stands *as a buffer between the government and the clients and* since this is a private corporation, bills owed to it are subject to the same laws of collection and outlawing of accounts the same as any other business corporation. Each separate organization represented by the Inter-Allied Council accepted this plan and signed the understanding.

2. That the Farmers Aid Corporation and its present administration bring its organization up-to-date.

3. That the Farm Security Administration through its present channels determine actual needs of its clients. This means that a special effort on the part of the Farm Security Administration should be made to thoroughly investigate the actual and real needs of its clients, and that no card shall be issued except to those in absolute need.

4. That clients found eligible for emergency medical care pay an initial fee of $5.00 to provide a fund for the immediate payment of bills for their emergency medical care.

5. That the client shall understand that he will be required to give a note to the Farmers Aid Corporation at the end of each month for all services received during that month. It is understood that this note pays for all services for that month in full and no additional charge can be made by members of the various professions.

6. That any client withdrawing from the Farmers Aid Corporation or who is dropped for any reason from the Farmers Aid Corporation forfeits his initial fee, this initial fee being regarded as insurance against possible emergency illnesses and accidents.

7. That each of the allied professions provide a fee schedule under which the work shall be done and that it is understood that the fee schedule shall be paid 100 per cent on approved bills.

8. That every individual member of the Inter-Allied group willing to participate under this emergency relief setup shall sign an agreement which will enable the clients to make their choice from this list of signers. The foregoing is entirely optional with each individual member of the allied professions. Payment for services will only be given to the members of the allied professions who have signed this agreement. Clients consulting other members of the allied professions not on this list must pay for services rendered from their own funds. Members of the allied professions are to be given a list of those signing this agreement for the purposes of reference.

9. That drugs prescribed under this setup be U. S. P. and N. F. drugs accepted by the Council of Pharmacy of the American Medical Association, except sera and biologicals, the majority of which may be obtained from the State Health Department, and that no drugs dispensed by physicians will be paid for and that no counter-prescribing will be paid for and that prescriptions can only be filled by registered pharmacists.

10. That emergency medical care means exactly what it says and shall be confined to acute infections, accidents, hem-

orrhages, perforations, obstructions, strangulations, confinements. Payment will be made for no tonsillectomies except where secondary complications make it imperative.

11. That each district medical society shall, through its officers, appoint an auditing committee consisting of three members from its membership, to go over the accounts as rendered by members of that district society before turning them into the state office.

N. K. HOPKINS, M.D., *Chairman*
T. F. RIGGS, M.D.
J. O. F. KRAUSHAAR, M.D.
B. A. DYAR, M.D.

Dr. Sherwood moved adoption and approval of the report of this committee for consideration of a medical relief plan. Motion seconded by Dr. Whiteside and passed.

Dr. Sherwood moved that the report of this committee be referred to the medical representatives on the Inter-Allied Council to be used in principle as a basis for negotiation in framing a plan for the care of the indigent FSA clients. *Motion seconded and passed.*

Dr. Donahoe moved that the Council extend to Dr. Dyar a vote of confidence and appreciation for his work as Medical Supervisor of the Farmers Aid Corporation. Motion seconded by Dr. Hart and passed.

Election of Chairman. Dr. Fleeger moved that Dr. Hohf be elected Chairman of the Council for the coming year. *Motion seconded and passed.*

There being no further business, the meeting adjourned.

CLARENCE E. SHERWOOD, M.D.,
Secretary.

REPORT OF THE AUDITING COMMITTEE

Honorable Council: The following is a report of the Auditing Committee:

1. All cash taken in checked against deposit slips in bank. This was found to check to the penny.
2. All bills paid checked against cancelled checks from bank. This checked to the penny.
3. The Legislature account checked separately, accounts received checked against bank deposit slips to the penny.

All bills paid checked against cancelled checks which checked perfectly.

Therefore, the Committee found the Secretary's books to be in first-class shape, and all accounts checking perfectly.

The Committee on behalf of the Council wishes to thank the Secretary (Dr. Clarence E. Sherwood), for his careful and complete system of handling the State Society accounts.

Recommendations—

4. Balance of the Legislative Budget to be retained in a special fund.
5. Effort to be made to increase fund by soliciting those who did not pay their $15.00 share into the legislative fund.
6. That Karl Goldsmith be retained on an annual basis.
7. That the Public Policy and Legislative Committee be more active in counteracting adverse propaganda.

Respectfully submitted,
W. G. MAGEE, M.D.
WILLIAM DUNCAN, M.D.
D. S. BAUGHMAN, M.D.

PROPOSED AMENDMENT

To the Constitution of the South Dakota State Medical Association

Article IX

Officers

Section 2 of the Constitution shall be amended to read as follows:

The officers, except the Councilors, shall be elected annually by the House of Delegates. The Councilors shall be elected by the component societies which they represent. The terms of the Councilors and of the Secretary-Treasurer shall be for three years; one third of the members of the Council shall be elected each year. The Secretary-Treasurer shall be elected by the Council. All of these officers shall serve until their successors are elected and installed.

REPORT OF THE COUNCIL

June 17, 1938

The meeting of the Council of the South Dakota State Medical Association was called to order in room 729, Marvin Hughitt Hotel, at 2:15 p. m.

Roll call: The following were present: Drs. J. F. D. Cook, O. J. Mabee, C. E. Sherwood, J. D. Whiteside, W. G. Magee, D. S. Baughman, B. M. Hart, G. E. Burman, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, C. E. Lowe, Wm. Duncan, and E. A. Pittenger. Karl Goldsmith, Pierre attorney, was also present.

Dr. Cook read a letter from H. F. Stevens, Secretary of the Executive Committee of the State Dental Society, inviting our association to meet jointly with them in Aberdeen during May. General discussion was had and the matter tabled for the time being.

Dr. Pittenger moved that the officers of the association be instructed to arrange the program for the 1939 session in such a manner that all the business sessions be out of the way on the first day of the meeting, and that steps be taken at the meeting to amend the by-laws accordingly. Seconded by Dr. Magee and passed after a discussion.

Dr. Cook moved that in order to facilitate the business that all committee reports be in the hands of the secretary thirty days prior to the annual meeting. Seconded by Dr. Pittenger and passed.

The main business of the meeting was next taken up, which was the consideration of the draft of the Basic Science Bill. This was read by Karl Goldsmith, our attorney. There was a general discussion on a number of points. It was moved by Dr. Pittenger that we accept this draft as the one which we would present to the legislature. Seconded by Dr. Hart and passed with two dissenting. Dr. Baughman and Dr. Duncan felt that the composition of the examining board was not as we should desire it.

Dr. Hart made some observations on the conditions.

Dr. Cook moved that the Secretary be instructed to place a copy of this draft of the Basic Science Bill in the hands of the Councilor, Secretary, and President of each district society, and that they be instructed to discuss fully with all the doctors in the district this draft and report, through the councilor, to the secretary of the state association their reactions, together with any suggesions or alterations prior to September 1. This was seconded by Dr. Pittenger and Dr. Mabee. *Passed.*

The matter of the invitation from the State Dental Society was again taken up and was referred to the Aberdeen District Society to recommend to the Council as to whether a joint meeting might be advisable because of hotel accommodations. *It was seconded and passed.*

Telephone bill for Dr. Cook was allowed and ordered paid.

There being no further business the meeting was adjourned.

July 13, 1938

After sitting in with the Allied-Council and participating in the discussion of medical relief for the farm security clients the members of the Council convened in a separate room.

Minutes of the previous meeting held on June 17 were read and approved.

Dr. Cook discussed the matter of appointing a committee on industrial health as suggested by the American Medical Association. It was moved by Dr. Pittenger and seconded by Dr. Whiteside, that a committee of five be appointed. (Dr. Cook appointed Drs. R. W. Mullen, R. J. Jackson, and P. P. Ewald.)

The resignation of Dr. S. J. Walters of Winner was read, the reason for his resignation being that he was now practicing in California. It was moved by Dr. Lowe and seconded by Dr. Pittenger that Dr. R. E. Overton be appointed to fill in the unexpired term. *Passed.*

The quota on the special subscription was read by Dr. C. E. Sherwood.

	Members	
District 1	37	$ 647.50
District 2	22	385.00
District 3	22	385.00
District 4	18	315.00
District 5	15	262.50

District 6	23	402.50
District 7	45	787.50
District 8	40	700.00
District 9	46	805.00
District 10	6	105.00
District 12	12	210.00
		$5,005.50

It was moved by Dr. Baughman and seconded by Dr. Hart that the quota be accepted and sent to the component societies.

There being no further business the meeting adjourned after an informal discussion of the Basic Science Bill.

September 12, 1938

The Council of the South Dakota State Medical Association convened at the Marvin Hughitt Hotel in Huron, Monday, September 12, at 10:15 a. m. Dr. S. M. Hohf, Chairman, presided.

The following members were present: Drs. J. F. D. Cook, O. J. Mabee, J. C. Shirley, B. A. Dyar, J. R. Westaby, C. E. Sherwood, J. D. Whiteside, W. G. Magee, B. M. Hart, G. E. Burman, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, Wm. Duncan, and E. A. Pittenger. Karl Goldsmith, our attorney, was also present.

Discussion of the Basic Science Bill was had with consideration of the various changes recommended by the District Societies.

Dr. Pittenger moved and Dr. J. R. Westaby seconded that the bill be so changed as to make the examining board five members instead of three. *Motion was carried.*

It was moved by Dr. J. R. Westaby, seconded by Dr. Mabee that the initial registration fee be changed to $5.00. After a discussion the motion was carried.

It was moved by Dr. J. R. Westaby and seconded by Dr. Pittenger that citizenship in the United States be required to qualify for examination. After a discussion the motion was carried.

Dr. Cook presented literature and publications that had been used in Kansas and Michigan in the passage of the Basic Science Law. It was moved and seconded that the material be given to our attorney, Karl Goldsmith, and that he look it over and make such revisions as necessary for use in South Dakota and that it then be referred to the Basic Science Committee. *Motion passed.*

Dr. A. S. Rider, Flandreau, a member of the Planning Board, was present and explained the projected study of medical care that the Medical Committee of the Planning Board expect to undertake.

Dr. Kraushaar suggested that our committee turn over the material of the American Medical Association survey to this committee and allow them to make the survey for the state association. It was moved and seconded that Dr. Kraushaar be authorized to do this. *Motion carried.*

Council adjourned to the dining room for luncheon. Here the consideration of business was continued.

After a discussion by Dr. Kraushaar, a member of the Allied-Council, and Dr. Dyar, on the F. A. C., it was moved by Dr. Hart and seconded by Dr. Duncan that the plan as outlined be accepted and that the South Dakota State Medical Association coöperate. *Motion carried.*

Dr. Pittenger moved and it was seconded that the secretary be authorized to write the Farmer's Aid Corporation that it is our request that Dr. B. A. Dyar be retained as supervisor in the new set-up. *Motion carried.*

Luncheon being completed the Council re-adjourned to the place of meeting and continued their discussion.

It being necessary for Dr. S. M. Hohf to leave, Dr. J. F. D. Cook presided at the balance of the session.

It was moved and seconded that the Committee on General Arrangements for the next annual session is to be composed of Dr. Cook, Dr. Shirley, and Dr. C. E. Sherwood.

Upon recommendation of the Committee on General Arrangements, Dr. J. L. Calene of Aberdeen was appointed chairman of the Committee on Local Arrangements.

It was moved by Dr. Pittenger and seconded by Dr. Hart that the dates of the next annual session of the South Dakota State Medical Association be set as the 8th, 9th and 10th o May, 1939. *Motion carried.*

Moved by Dr. Magee and seconded that the matter of a ranging for a joint meeting of the Dental Society be referre to the Committee on Local Arrangements. *Carried.*

It was moved by Dr. Mabee and seconded that necessary e penses for programs for the postgraduate courses be paid fr out of association funds. *Motion carried.*

Dr. Dyar presented the matter of coöperative radio program between the State Board of Health and the State Associatio It was moved by Dr. Pittenger and seconded by Dr. Westal that our committee be authorized to coöperate with the Sta Board of Health in presenting these radio programs.

A general discussion was held to consider the matters to con before the Special Session of the House of Delegates of t American Medical Association. Our delegate was instructed use his best discretion in voting on the matters.

There being no further business, the meeting adjourned.

November 29, 1938

The Council of the South Dakota State Medical Associati convened in the private dining room of the Marvin Hughi Hotel, in Huron at noon, Tuesday, November 29, 1938.

The meeting was called to order by the chairman, Dr. S. M Hohf.

The following were present: Drs. J. F. D. Cook, J. C. Shi ley, B. A. Dyar, C. E. Sherwood, J. R. Westaby, J. D. Whit side, W. G. Mabee, D. S. Baughman, B. M. Hart, J. H. Lloy W. E. Donahoe, S. M. Hohf, Wm. Duncan, and E. A. P tenger. Dr. J. D. Alway, of the Basic Science Committee, ar Dr. J. D. Calene, local chairman in charge of arrangements f the annual session, and our attorney, Karl Goldsmith, were al present.

Minutes of the previous meeting were read and approved.

The secretary reported on the recent refresher course. A ge eral discussion was held as to the value and the desirability continuing them in the future. Moved by Dr. Donahoe, a seconded by Dr. Duncan that we should arrange similar cours in the future in accordance with funds available. *Motion carrie*

Dr. Duncan moved that the Council send a note of appreci tion to the State Board of Health for their coöperation in secu ing funds which made this work available. *Motion second and passed.*

Dr. Cook reported on correspondence he had recently receiv from the Social Security Board asking that the South Dako State Medical Association coöperate with the Basic Scien Board in working out some plan whereby the needed medi care for Old Age Assistance clients might be budgeted and t physicians receive the money so budgeted. The matter was d cussed by Dr. Dyar and other members of the Council. It w moved by Dr. Baughman, and seconded by Dr. Westaby th our Executive Secretary, Dr. Dyar, be designated as the rep sentative of the South Dakota State Medical Association formulate with the Social Security Board a tentative plan a report back to the Council. *Motion carried.*

Dr. Cook also presented a letter from Dr. Braasch urgi the importance and necessity of getting the information as so as possible from the survey on medical care as formulated a fostered by the American Medical Association. In discussi of this matter he also read correspondence from Dr. Rid through whom this matter had been delegated to the Planni Board Committee. After a general discussion it was moved Dr. Pittenger and seconded by Dr. Duncan, that the secreta be instructed to contact Dr. Rider and find out the probabi ties of action in this matter in the near future and that t President, President-elect and Secretary be empowered to ta whatever action in the matter of making the survey that th should deem proper. *Motion carried.*

The Secretary, in discussing the Basic Science Bill, read l ters he had received in response to the appeal for a special leg lative fund. A general discussion was had and it was decid that the Secretary should write the District Secretary urgi them to raise, as budgeted, and convey the information to the that the money so collected should be handled through t regular Secretary-Treasurer, that the money would be expend in the regular manner only upon authorization by the Counc and that any fund collected in excess of the required amou

for the legislative fund would be prorated back to the District Society.

The publication of the pamphlet to be used in educational work on the Basic Science Bill was discussed and the Secretary was instructed to publish 2000 copies. That they were to be sent to all pharmacists, physicians, and hospital superintendents, and a supply be sent to the District Secretaries with the instructions that they have each member of the legislature contacted and the proposed bill explained to them, and asked that the Secretary report back to the state office the reaction of the legislator.

Dr. Duncan moved and Dr. Lloyd seconded that Karl Goldsmith be designated as the chairman of our lobby and that he be given authority to call on members of the state association at any time for help. *Motion carried.*

After a general discussion of matters pertaining to our legislative campaign with Karl Goldsmith the meeting was adjourned.

January 18, 1939

The Council of the South Dakota State Medical Association held their meeting 12:30 p. m., noon luncheon at the St. Charles Hotel in Pierre, South Dakota.

The following members were present: Drs. J. F. D. Cook, J. C. Shirley, O. J. Mabee, J. D. Whiteside, D. S. Baughman, B. M. Hart, W. E. Donahoe, S. M. Hohf, Wm. Duncan, D. Mills, State Representative of Wahl, S. D., N. T. Owen, member of Board of Health, Attorney Karl Goldsmith, and Miss Knodell, stenographer.

Dr. Cook called the attention of the Council to the matters requested by Secretary Sherwood, relative to the financial special fund, total receipts of $2250. Also the status of the American Medical Association survey, which is now in the hands of Dr. Kraushaar, Dean Serles coöperating.

Motion by Dr. Cook, and seconded by Dr. Hart, that the Council provide for the expenses of these members to Pierre; that travel be five cents per mile by auto; that the hotel bill be paid, and that the railway expense be paid when train service was used. *Motion carried.*

Attorney Goldsmith discussed the Basic Science Bill and outlined methods of procedure. A committee hearing on House Bill No. 10, was on schedule for 3:30 p. m.

There being no further business, the meeting adjourned.

MISS KNODELL, *Stenographer*
J. F. D. COOK, M.D., *President*

The members of the Council attended the meeting at 3:30 p. m. and were well received. Another meeting of the committee is called for 3:30 p. m. Tuesday, January 24, at which time we are to appear on behalf of the Basic Science Bill.

February 14, 1939

A special meeting of the Council was held in Pierre, Tuesday, February 14, at 2 p. m.

Roll call. Members present were: Drs. Cook, Mabee, Dyar, Sherwood, Westaby, Whiteside, Baughman, Hart, Burman, Donahoe, Hohf, Fleeger and Duncan. Dr. J. D. Alway took Dr. Pittenger's place. Quorum present.

Minutes of the previous meeting were read and approved.

Dr. Cook introduced Karl Goldsmith, who discussed the Basic Science Bill. It was moved by Dr. Mabee and seconded by Dr. Baughman, that House Bill No. 10, as amended, be approved. *Motion carried.*

Dr. Donahoe discussed the bill which pertains to the examination of food handlers. Dr. Sherwood called attention to the report of the Public Health Committee of the South Dakota State Medical Association pertaining to this matter in the July 1938 issue of the JOURNAL-LANCET.

House Bill 47 was discussed. It was moved by Dr. Donahoe and seconded by Dr. Whiteside that action on this bill be left to the committee to decide. *Motion carried.*

The Secretary reported on the legislative action of the Michigan State Medical Association pertaining to their prepayment plan of hospitalization and medical care.

There being no further discussion of medical subjects, the meeting was adjourned.

C. E. SHERWOOD, M.D.,
Secretary,
South Dakota State Medical Association.

HOUSE OF DELEGATES, SOUTH DAKOTA STATE MEDICAL ASSOCIATION

First Meeting

Aberdeen, South Dakota, April 24, 1939

The first meeting of the House of Delegates was held at 2:00 p. m. at the Alonzo Ward Hotel, April 24, 1939. President-elect Dr. J. D. Shirley presided, Dr. C. E. Sherwood, Secretary.

Roll Call: Drs. J. C. Shirley, C. E. Sherwood, B. A. Dyar, J. R. Westaby, J. D. Whiteside, W. G. Magee, D. S. Baughman, B. M. Hart, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, R. B. Fleeger, C. E. Lowe, Wm. Duncan, E. A. Pittenger, E. A. Rudolph, J. E. Bruner, H. R. Brown, G. E. Whitson, T. F. Riggs, E. W. Jones, L. J. Pankow, F. W. Haas, G. W. Mills, J. E. Curtis, Faris Pfister, J. C. Ohlmacher. Quorum present.

President-elect Dr. J. C. Shirley appointed the following reference committees: Reports of Officers: Drs. Lloyd, Lowe and Bruner. Resolutions and Memorials: Drs. Fleeger, Hohf, Riggs. Amendments to the Constitution and By-Laws: Drs. Pfister, Howe, Pankow, Ball, Riggs, Burman, Haas, Lowe, Curtis, Duncan, Pankow and Whitson. Credentials: Drs. Ohlmacher, Fleeger, Duncan.

The Secretary presented the minutes of the 1938 meeting as printed in the July 1938 issue of the JOURNAL-LANCET. Dr. Pankow moved that the House of Delegates accept the report as printed in the JOURNAL-LANCET. *Motion seconded and passed.*

The report of the Secretary-Treasurer was read by Dr. C. E. Sherwood and presented to the proper committee for approval.

Dr. Westaby moved that the Secretary be allowed to send a wire to Dr. O. J. Mabee offering the good wishes of the House of Delegates for his speedy recovery from pneumonia. *Motion seconded and passed.*

In the absence of Dr. Cook, President of the State Medical Association, Dr. Sherwood read his address. It was moved by Dr. Pankow and seconded that this address and report of the President be referred to the proper committee. *Motion carried.*

Dr. J. R. Westaby presented his report as 1938 delegate to the American Medical Association. Referred to Reference Committee.

The reports of the Standing and Special Committees were given:

Committee on Scientific Work submitted program as its report.

Committee on Public Policy. Report contained in Dr. Cook's address. Referred to proper committee.

Committee on Publications. The Secretary reported that the JOURNAL-LANCET was designated as the official publication of the South Dakota State Medical Association for a period of five years at the meeting of the South Dakota State Medical Association in 1938. The Council in their first meeting entered into a new financial agreement with a representative of the JOURNAL-LANCET. For the coming year the price of the JOURNAL-LANCET will be $1.75 and each year thereafter $2.00.

Committee on Medical Defense. No report of malpractice suits.

Medical Education and Hospitals Committee. No report.

Committee on Medical Economics. Report presented by Dr. Kraushaar. Referred to Reference Committee.

Committee on Public Health. Report read by the Secretary and referred to Reference Committee.

Committee on Necrology. The report of deceased members was read by the Secretary and referred to proper committee.

Committee on Spafford Memorial Fund. Report given by Dr. Ohlmacher and referred to proper committee.

Committee on Syphilis Control. No report.

Committee on Radio Broadcasts. Submitted by Dr. Hohf. Referred to proper committee.

Editorial Committee. No report.

Basic Science Committee. This report was read by the Secretary and referred to proper committee. A discussion was held concerning the matter of referring the two laws passed at the recent session of the legislature pertaining to blood tests on pregnant women and blood tests for applicants for a marriage license. It was moved by Dr. Pittenger and seconded by

Dr. Pankow that it is the concensus of this meeting assembled that we are in favor of the bills as they were passed by the legislature and that a committee be appointed to draw up a resolution to that effect to be given to the Associated Press. Motion carried.

Committee on Medical Licensure. Report read and referred to proper committee. A discussion was held concerning the licensing of foreign graduates in this state.

Committee on Woman's Auxiliary. No report.

Committee on Military Affairs. No report.

Committee on Radiology. Report read by the Secretary. Referred to proper committee.

Committee on Postgraduate Course. Report given by Dr. Ohlmacher and referred to proper committee.

Committee on Orthopedics. Report was read by the Secretary and referred to proper committee.

Committee on Social Security. No report.

Committee on Ophthalmology and Otolaryngology. Report read by the Secretary. Report referred to proper committee.

Old Business. None.

New Business. The matter of fees for Wassermanns in conjunction with recent legislation was discussed. It was moved by Dr. Duncan and seconded that a recommendation be made to the doctors of the State that a charge of not more than $2 be made for taking blood for a Wassermann necessary in the issuance of marriage licenses. *Motion passed.*

Dr. Pittenger moved that Dr. J. D. Alway be named as a candidate for the Basic Science Board. Motion seconded by Dr. Duncan. *Carried.*

Dr. Mills nominated the name of Dr. J. C. Ohlmacher as a candidate to serve on this same board. *Motion seconded and passed.* Further action on this matter was deferred until the next meeting of the House of Delegates.

Matter of appropriation for the construction of a new building for the Army Medical Library and Museum at Washington was referred to the Committee on Resolutions and Memorials.

It was moved by Dr. Whitson and seconded that the name of Dr. Scanlon be placed on the honor roll of the State Medical Association. *Motion passed.*

The matter of amending the constitution and by-laws was presented by Dr. Pfister. Further information concerning this subject was explained by Dr. Pankow. These amendments will be reported back to the House of Delegates at the next meeting.

Dr. Hohf moved that Dr. C. M. Keeling of Springfield be elected an honorary member of the State Medical Association. *Motion seconded and passed.*

Report of the Inter-Allied Council was given by Dr. Hopkins. Referred to proper committee.

A telegram was read from the county commissioners in Edmunds county concerning the financial situation in that county as it applies to medical relief.

The meeting adjourned.

CLARENCE E. SHERWOOD, M.D.,
Secretary.

Second Meeting of the House of Delegates
April 24, 1939

The second meeting of the House of Delegates was held at 8:30 p. m. April 24, 1939, at the Alonzo Ward Hotel, Dr. Shirley presiding. Dr. C. E. Sherwood, Secretary.

Roll Call: Drs. J. C. Shirley, C. E. Sherwood, B. A. Dyar, J. R. Westaby, J. D. Whiteside, W. G. Magee, D. S. Baughman, B. M. Hart, J. H. Lloyd, W. E. Donahoe, S. M. Hohf, R. B. Fleeger, C. E. Lowe, Wm. Duncan, E. A. Pittenger, E. A. Rudolph, J. E. Bruner, H. R. Brown, G. E. Whitson, T. F. Riggs, E. W. Jones, L. J. Pankow, F. W. Haas, J. C. Ohlmacher, G. W. Mills, F. S. Howe, J. E. Curtis, Faris Pfister. Quorum present.

The minutes of the previous meeting were read by the Secretary and approved as read.

The report of the Committee on Nominations and Place of Meeting was given by Dr. Jones. The following were nominated for President-elect: Drs. O. J. Mabee and J. F. D. Cook; for Vice-President, Drs. B. M. Hart and T. F. Riggs; for Councilors, Dr. D. S. Baughman, Madison District, Dr. G. E. Burman, Huron District; Dr. J. H. Lloyd, Mitchell District, and Dr. W. E. Donahoe, Sioux Falls District. Place of Meeting, Watertown and Sioux Falls.

It was moved and seconded that this report be accepted. A supplementary motion was made by Dr. Riggs that the Council accept the resignation of Dr. B. M. Hart as Councilor from the 4th District and the name of Dr. C. E. Robbins be nominated to fill the unexpired term of Dr. Hart. *Motion seconded and passed.* There being no further nominations, balloting was completed with the following results:

President-elect, Dr. O. J. Mabee.
Vice-President, Dr. B. M. Hart.
Councilor, Madison District, Dr. D. S. Baughman.
Councilor, Huron District, Dr. G. E. Burman.
Councilor, Mitchell District, Dr. J. H. Lloyd.
Councilor, Sioux Falls District, Dr. W. E. Donahoe.
Councilor, Pierre District, Dr. C. E. Robbins.
Place of Meeting, Watertown.

The President-elect delivered a short address.

The report of the Reference Committee on Reports of Officers was given by Dr. Lloyd. Dr. Pfister moved and Dr. Whitson seconded a motion to adopt this report as read. *Motion passed.*

The report of the Reference Committee on Resolutions and Memorials was presented by Dr. Fleeger as follows: "Your committee recommends that the communication from the American Medical Association relative to the Army Medical Library and Museum to be taken care of by the President of the Association appointing a committee as requested. It is resolved that the South Dakota Medical Association is heartily in favor with all the aims and efforts of the Inter-Allied Council and assure our coöperation. We recommend that the report of the standing and special committees including Orthopedics, Postgraduate, Radiology, Medical Licensure, Basic Science, Broadcasting, Spafford Memorial, Necrology, Public Health, and Medical Defense be accepted and placed on file. With reference to the Postgraduate Course, your committee recommends that this important course be continued. If funds from the State Board of Health be available, that they be continued to be used for this purpose. Your committee is heartily in accord with the recommendation embodied in the report of the Committee on Medical Licensure, with reference to the qualifications of candidates for licensure. Your committee recommends that a vote of thanks from the Association be extended to Attorney Goldsmith for the commendable service which he rendered in behalf of the Association during the recent legislative session." It was moved by Dr. Howe and seconded that the report be adopted. *Passed.*

Report of Committee on Amendments and By-Laws was presented by Dr. Pfister. Dr. Pfister presented new changes to the constitution; Dr. Pankow presented new changes to the by-laws with the recommendation that amendments to the constitution be placed on file for a period of a year, to be voted upon at the next State meeting. The by-laws must lie on the table for 24 hours before being voted upon.

There was no old business to be taken up.

New Business. The matter of dues for the coming year was discussed briefly. It was moved by Dr. Whitson and seconded by Dr. Howe that the dues for the coming year remain $10.00. *Motion carried.*

The matter of selecting nominees for the non-professional member to act on the Basic Science Board to be recommended to the Governor was next presented. Dr. Hohf nominated the names of Dr. H. Morrow Sweeney and Dr. William H. Waller of the University of South Dakota. Dr. Hopkins nominated J. L. Taylor of State College. It was moved by Dr. Pittenger that the Association submit the names of all three to the Governor for his action and appointment. *Motion seconded and passed.*

The Secretary explained the matter of redistricting the medical societies of the state. Dr. Whitson moved and Dr. Rudolph seconded a motion that the matter be accepted as presented. *Motion carried.*

The Secretary called attention to the American Congress on Obstetrics and Gynecology to be held at Cleveland, Ohio, September 11 to 15, 1939.

The matter of continuation of the Farmers Aid Corporation was next taken up. Each Councilor expressed the views of the doctors in his District toward the present medical aid program. The Farmers Aid Corporation program was discussed by the Councilors and Delegates.

Dr. Pankow moved that this organization go on record as not favoring the setup of the present FAC program. *Motion seconded and carried.*

Dr. Howe moved that it be the sense of this meeting that a committee be empowered to draw up a plan for submission to the Council for the care of the needy active grant cases. Motion was seconded by Dr. Riggs and passed. A supplementary motion was made wherein this committee be authorized to coöperate with the Inter-Allied Council. *Seconded and passed.*

Dr. Shirley appointed the following doctors to act on this committee: Drs. Hopkins, Kraushaar, Riggs, with Dr. Dyar as ex-officio member.

Meeting adjourned.

CLARENCE E. SHERWOOD, M.D.,
Secretary.

Third Meeting of the House of Delegates
April 25, 1939

The third meeting of the House of Delegates, which was an adjourned meeting, was held at 5:00 p. m., Tuesday, April 25, 1939, Dr. J. C. Shirley presiding. Dr. C. E. Sherwood, Secretary.

Roll Call: Drs. J. C. Shirley, C. E. Sherwood, J. D. Whiteside, W. G. Magee, J. E. Bruner, H. R. Brown, D. S. Baughman, G. E. Whitson, J. H. Lloyd, E. W. Jones, L. J. Pankow, Paul Billingsley, S. M. Hohf, F. W. Haas, J. C. Ohlmacher, R. B. Fleeger, F. S. Howe, G. W. Mills, C. E. Lowe, J. E. Curtis, Wm. Duncan, Faris Pfister, E. A. Pittenger. Quorum present.

The purpose of the meeting was to vote on the amendments to the by-laws.

Dr. Pankow moved that Dr. Billingsley be permitted to act as a delegate from the Sioux Falls District in the absence of the regular delegate. Motion seconded by Dr. Duncan and passed.

Dr. Pfister moved that Chapter III, House of Delegates, Section 2, be amended to read as follows: "Each component society shall be entitled, each year, to send one delegate or one corresponding alternate to the House of Delegates for each twenty-five full-paid memberships or fraction thereof in this Association as shown by the records of the Association at the close of the previous fiscal year, provided however, that each component society shall be entitled to at least one delegate or one corresponding alternate, be adopted." *Motion seconded.*

The delegates voted as follows: *Yea,* Drs. Brown, Pankow, Ohlmacher, Duncan, Pfister; *Nay,* Whiteside, Magee, Baughman, Whitson, Lloyd, Jones, Hohf, Haas, Fleeger, Howe, Mills, Lowe, Curtis and Pittenger. Dr. Bruner was absent when this vote was taken and Dr. Billingsley passed because he was not familiar with the amendment. *Amendment lost.*

Dr. Pankow moved that Section 10, to be added to Chapter III, House of Delegates, as follows: "Each component society shall be entitled to cast a number of votes equal to the number of delegates to which it is entitled according to the terms of these by-laws, and on election of officers, all questions of policy of the Association, finances of the Association, changes in the constitution and by-laws of the Association and all matters other than the ordinary routine of business and procedure, all balloting shall be by roll call of the component societies. The ballot result shall become a part of the permanent records of the Association," be adopted. Motion seconded by Dr. Pfister.

The delegates voted as follows: *Yea,* Drs. Brown, Lloyd, Pankow, Billingsley, Pfister; *Nay,* Whiteside, Magee, Bruner, Baughman, Whitson, Jones, Hohf, Haas, Ohlmacher, Fleeger, Howe, Mills, Lowe, Curtis, Duncan, Pittenger. *Amendment lost.*

Dr. Pankow moved that the following amendment to the amendment to Chapter VIII, Dues and Assessments, Section 1 as follows: "The last sentence be amended to read 'December 31' instead of 'March 1', as at present, and the final period of this section shall be changed to a semicolon and the following added: 'Provided said member shall have been a member in good standing in this Association for a period of not less than two consecutive years immediately prior to the current year,' be changed to read as follows: That the words 'December 31' be stricken and the words 'July 1' be substituted." Motion seconded by Dr. Baughman.

A roll call vote was taken with the delegates voting on the amendment to the amendment as follows: *Yea,* Drs. Whiteside, Magee, Brown, Baughman, Whitson, Pankow, Billingsley, Ohlmacher, Mills, Duncan, Pfister. *Nay,* Drs. Bruner, Lloyd, Jones, Hohf, Haas, Fleeger, Howe, Lowe, Curtis, Pittenger. *Amendment to the amendment carried.*

Dr. Pankow moved the adoption of this amendment to the by-laws. Motion seconded.

The delegates voted on the amendment as follows: *Yea,* Drs. Bruner, Brown, Pankow, Billingsley, Ohlmacher, Duncan, Pfister; *Nay,* Whiteside, Magee, Baughman, Whitson, Lloyd, Jones, Hohf, Haas, Fleeger, Howe, Mills, Lowe, Curtis, Pittenger. *Amendment lost.*

There being no further business, the meeting adjourned.

CLARENCE E. SHERWOOD, M.D.,
Secretary.

REPORT OF COMMITTEE ON OPHTHALMOLOGY AND OTOLARYNGOLOGY
(Advisory to State Departments)

The South Dakota Academy have taken action restricting examiners for the Social Security Aid to the Blind to be given by members of our Academy only. Our members gave all the support they could to any of the bills which represented the legislation in this session and were quite active in the support of the program.

Respectfully submitted,
JOHN GREGG, M.D.
H. L. SAYLOR, M.D.

REPORT OF THE PUBLIC HEALTH COMMITTEE

Your committee has continued its practice of coöperating with the other agencies in the State which are doing Public Health work. The sub-committee on Child Welfare and Mental Hygiene continues its coöperation with lay groups but has no specific report to make at this time.

The cancer sub-committee begs to report that their activities this year have been limited to various papers and discussions of cancer before medical societies and lay groups. The cancer study has been overshadowed in the state during the past year by the medical profession in their fight for control of syphilis and pneumonia. However, your committee still considers that the cancer problem is most urgent, being second among the leading causes of death and being estimated that one of ten who reach the age of twenty-five is destined to die of cancer. In South Dakota we have an average death rate from cancer of nearly six hundred annually. Your committee therefore recommends that intensive study of cancer be undertaken by the Public Health committee during 1939, stressing reliable information for the public as to early diagnosis of cancer and frequent health examinations.

Tuberculosis continues to take its toll in South Dakota. The greatest cause for these deaths is the fact that the disease is still found only in advanced stages. There are doctors in South Dakota who have awakened to their responsibility to the tuberculous of the state. Evidence of this is seen by the admitting to the Sanatorium from those areas, of early and even questionable cases of infection. This is the only way we may get ahead of the disease. There are other areas from which only far advanced terminal cases are sent to the Sanatorium. In those areas, I feel, should be concentrated efforts at early diagnosis campaigns. This education is needed by us as physicians as well as by the general public. The state Tuberculosis Association has always coöperated with the doctors of the state. Their job is educational, their literature worthwhile.

The Sanatorium at Sanator feels it an obligation to assist the physicians in any way possible. Its physicians gave their

opinion on 500 chest films the past year and have examined many chests in consultation. More and more cases with collapse will be dismissed from the Sanatorium and the state has not enough trained physicians to continue this. It is imperative that there be physicians trained to do this work. There is a standing invitation for any physician in the state to spend as much time as desired at the State Sanatorium.

The legislature has seen fit to cut the budget of the Sanatorium, thus hampering its progress. It was hoped that a surgical department might be added. The physicians of the state should insist that this be done as an advance in scientific care of the tuberculous in South Dakota.

The tuberculosis committee further recommends that a better system of case reporting and follow-up be established in the state of South Dakota. At the present time no definite attempt is made to check on all public contacts with a known case of tuberculosis, nor is there any following up of those cases which are arrested and sent home from the Sanatorium.

We feel that in order to have an adequate program in the state both these things are essential and should be part of the state tuberculosis program.

These things we recommend so that they may be urged upon the legislative body at the next session.

J. VINCENT SHERWOOD, M.D.,
Chairman.

REPORT OF COMMITTEE ON MEDICAL LICENSURE

To the President and Members of the South Dakota Medical Association: Your committee on Medical Licensure beg to make the following report: The work of this committee has been advisory in nature providing so far as possible moral backing to the Director of Medical Licensure, following out the regulations of the State Board of Health in so much as they applied to Medical Licensure.

The question of licensing foreign applicants came up for consideration before the State Board, on account of the application of a foreign applicant for license in South Dakota. Your committee recommended that first, the applicant must be a citizen of the United States, second, he must, if graduated from a foreign school, have graduated from some school whose standards correspond with our Class A medical schools. In so much as we have no exact classification for foreign schools this may be a rather difficult question for the State Board to decide upon.

In general the view taken and advised by your committee was adopted by the State Board of Health. We believe that this has been made a permanent policy by the State Board. In as much as conditions are such as we may have many foreign applications in the State, it is very important to this Association and the Medical profession of the State.

Your committee has at all times coöperated with and given such backing as was necessary to the Director of Medical Licensure in carrying out the laws and regulations of the State Board of Health relating to Medical Licensure. We wish to express our appreciation for the fine coöperation that we have had from Dr. Dyar, the retiring Director of Medical Licensure. We feel sure that we will have the same splendid coöperation from the new Director, Dr. Van Heuvelen.

While the duties of this committee are not heavy we feel that it is imperative that we have the closest coöperation between your committee and the Director of Medical Licensure.

F. S. HOWE, M.D.
MERRILL W. PANGBURN, M.D.
J. D. WHITESIDE, M.D.

REPORT OF COMMITTEE ON INTER-ALLIED RELATIONS

To the Officers and House of Delegates of the South Dakota Medical Association: Your committee on the Inter-Allied Relations wishes to submit the following report.

The Inter-Allied Professional Association has been in existence now for five years. During that time some of the sections of the state have been organized into districts but not the whole state. It is hoped that sometime we will be able to report the completion of this organization. This however is not the most important feature of the activities of this organization. The active part of the organization consists of the Inter-Allied Council consisting of two members from each of the State Associations of the Pharmacists, Dentists, Nurses, Hospitals and Physicians. During the past year the Council has held two meetings, one at Huron and one at Aberdeen.

What has this accomplished? First it has brought the various professional associations closer together than any other one thing or dozen things that have ever been attempted before. The various professions now understand each other better than ever before. Second, this unity of the professions made it possible for the medical association to pass a Basic Science law at the last session of the legislature which would have been almost an utter impossibility had the medical men attempted the passage alone. In other matters of legislation the unity of the professions was just as important.

All the various features of Inter-Allied activities have not been perfect but the Council has tried its best to benefit the state as a whole. The one thing that has been mostly in mind and prominent in thought is the success or failure of the FAC. We acknowledge that it is a bone of contention and a matter that needs very careful consideration; one that must not be decided on definitely on the spur of the moment. On Sunday night the Inter-Allied Council met with a 100 per cent attendance and discussed this matter very fully and will submit to each of the associations a proposal for the continuation of the FAC with several modifications from the present set-up.

B. A. DYAR, M.D.
J. O. F. KRAUSHAAR, M.D.
N. K. HOPKINS, M.D.

REPORT OF COMMITTEE ON THE SPAFFORD MEMORIAL FUND FOR A SCHOLARSHIP AT THE UNIVERSITY OF SOUTH DAKOTA

The following report is respectfully reported by your committee.

The younger members of this Association may not be aware just what the nature of this endowment consists of and so we are taking the liberty of reiterating its provisions. In University parlance this is cited as follows: "The Dr. Frederick Angier Spafford Memorial Prize is awarded each year to that student who, in the opinion of the committee, has made the most satisfactory progress in the study of Latin, preferably Virgil. This prize was established by the South Dakota State Medical Association and other friends of Dr. Spafford in recognition of his many years of service as a member of the State Board of Regents of Education and especially of his interest in the study of the ancient classics. Amount, $25.00."

This fund was placed in the hands of the treasurer of the scholarship funds of the University of South Dakota. It was loaned to a neighboring farmer along with a similar fund from the University, and a first mortgage taken on his property.

For the first three years after the loan was made the interest, consisting of $60, was allotted to the following students: 1929—Mamie Wara, Madison; 1930—Dorothy Cole, Madison; 1931—Agnes Schmidt, Castlewood. Then there came a period of four years when no money was derived from this fund, the mortgagee being unable to pay the interest. The record of scholarships awarded during this time is as follows: 1932—Ernie Lovejoy, Vermillion, no money available; 1933—Ruth Waggoner, Phillip, no funds; 1934—Marion Schmidt, Castlewood, no funds; 1935—not awarded. For the past three years the scholarship has been awarded and a prize of $25 given to each recipient, the money being appropriated from another fund. In 1936 it was awarded to Louise Breckerbaumer, Sioux City, Iowa; 1937—Maude Adams, Jefferson; and 1938—Emma Wiken, Volin. In all but one instance the award was made to a resident of South Dakota.

I am assured that the scholarship will continue and if possible, a cash prize granted. The property acquired by this transaction is valuable and if sold it should bring a good price. The $1000 will then be made available.

(Signed) J. C. OHLMACHER, M.D., *Chairman.*

April 24, 1939.

REPORT OF COMMITTEE ON POSTGRADUATE COURSE

The committee respectfully submits this brief report covering activities for the last year.

Most active in shaping the program was Dr. C. E. Sherwood, secretary of the State Medical Association. To him our gratitude is extended.

Several meetings of the committee with Dr. Sherwood were held at Huron. The program was finally adopted. This program was as follows: 9:00 A. M.—Viola Russell, M.D., Director Division of Maternal and Child Health, Pierre; 9:30 A. M.—R. J. Moe, M.D., Duluth Clinic, Minnesota: Toxemias of Pregnancy; 10:45 A. M.—A. V. Stoesser, M.D., Associate Professor of Pediatrics, University of Minnesota: The Management and Feeding of the Infant from Birth to Six Months of Age.

Immediately after lunch Dr. G. J. Van Huevelen, Venereal Disease Control Officer of the State Board of Health, talked on "The Physician's Responsibility to the Syphilitic Patient." This was followed by interesting and instructive illustrated talks by Drs. Moe and Stoesser. Dr. Moe presented the subjects, "Accidents of Pregnancy and Labor" and Dr. Stoesser the subject, "The Specific Infections or Contagions of Early Childhood with Reference to Specific Diagnostic Tests, Prophylaxis, and Therapeutic Procedures."

This program was given on four consecutive days at Aberdeen, Sioux Falls, Huron, and Rapid City. The local chairman of each district was: Dr. J. E. Bruner, Aberdeen; Dr. W. E. Donahoe, Sioux Falls; Dr. J. E. Shirley, Huron, and Dr. R. E. Jernstrom, Rapid City. The number of physicians attending the meeting in each district was as follows: Aberdeen, 25; Sioux Falls, 60; Huron, 15, and Rapid City, 13. In addition a very considerable number of nurses from neighboring hospitals, and others interested in child welfare, attended.

It will be noted that by far the best attendance was at Sioux Falls. We have reason to believe that this was largely the result of enthusiastic, whole-hearted coöperation of Dr. W. E. Donahoe, chairman. He is to be congratulated.

The total expense of this program was $373.16, all of which was provided from a special fund at the disposal of the State Board of Health.

A few physicians in each district verbally expressed themselves as well pleased with the program. Only one wrote and offered any comment. One of the out-of-state men appearing on the program suggested that it would be better to hold these meetings in the afternoon, followed by a banquet and then continue with the balance of the program in the evening. This appears to be an excellent suggestion and no doubt your committee will be influenced by it in formulating their next program.

Just how we shall finance the next program is not certain. The State Medical Association has no funds for this purpose. We have been told, however, that the State Board of Health has a fund, part of which may be used for this purpose.

We believe that the postgraduate medical program should be continued and extended. We cannot hope to put on the ambitious program carried on in some states more fortunately situated than we in South Dakota. God and the weathertman being willing, the South Dakota doctors may yet be able to finance these programs. Speed the day.

(Signed) J. C. OHLMACHER, M.D., *Chairman.*
B. A. DYAR, M.D.

REPORT OF BASIC SCIENCE COMMITTEE

House Bill 10—The Basic Science Law, passed, has been signed by the Governor, and will become a law July 1, 1939. There were several amendments made in the bill, of which you have all been heretofore advised. This committee thinks that this bill is an excellent one and in the future will prove a great help to the medical profession. The committee wishes to stress that the council use great care in their selection of our member of the board.

A resume of other bills particularly affecting the medical profession follows:

Senate Bill 218—The Chiropractors bill was amended so that the chiropractors will have to take the Basic Science examination under the new Basic Science Board; will not be permitted to practice obstetrics or treat communicable diseases, and must be graduates of an approved school for a four year term instead of three years; must be graduates of high school instead of having a high school education or its equivalent, and must confine themselves to the practice of chiropractic, which is defined, "to be the science of locating and removing the cause of any abnormal transmission of nerve energy including diagnostic and externally applied mechanical measures incident thereto."

House Bill 24—which permitted the osteopaths to do surgery passed the house but was defeated in the senate.

House Bill 47—which permits chiropractors and osteopaths to participate in the distribution of public funds, after being amended so it does not apply to the Crippled Children's program, passed the house and senate. A representative of the Federal Crippled Children's Bureau was present at Pierre and said that such amendment would take care of any Federal Public Health Program.

House Bill 92—the chiropractors Basic Science Law, died in Committee. This bill set up a separate board for the examination and licensing of chiropractors on the basic sciences.

In all, the committee feels the Medical Society did a wonderful job, but instead of resting on our oars now is the time to be alert and cash in on our success.

The work of Karl Goldsmith was outstanding and we don't think we could get a better man to uphold our interests. The committee therefore strongly recommends that he be retained on a yearly basis to police infringements against the above laws and also to combat future antagonistic legislation.

Dr. Mills, who is a member of the house, was also a great assistance and if it had not been for his support we probably would not have been as successful as we were. He should be commended by this group for his efforts.

J. D. ALWAY, M.D., *Chairman.*

REPORT OF COMMITTEE ON ORTHOPEDICS

April 18, 1939

The crippled children's program of this State since its inception has been mainly under the supervision of the State Board of Health. Prior to the passage of the Federal Social Security law the work was very limited, due to inadequate funds, not more than $5000 being available for any one year. With the passage of the Social Security law $35,000 of matched money was available. The State elected to use only $25,000 so $50,000 the past two years has been available for the care of crippled children for the fiscal years 1938 and 1939. This was budgeted as follows, compiled and submitted by Dr. R. H. Wilcox who was in charge of the crippled children program at that time:

$20,000 for hospitalization of crippled children.
$2,500 for care of crippled children in convalescent wards.
$3,500 for leg braces, body braces, artificial limbs, etc.
$6,600 for nursing care in homes. Case finding and travel incident thereto, including nurses salaries.
$8,330 for surgeon's fees.
$1,500 for transporting crippled children and their guardian.
$1,470 for social service and salary for social service worker.

For Administrative Expense:
$3,000 Director's salary.
$900 Director's travel.
$1,200 Stenographer's salary.
$300 out of state travel—generally rebudgeted in last quarter of fiscal year to hospitalization.
$200 office supplies.
$250 office equipment.
$250 Communication.

During the first half of the fiscal year for which the above budget is set up 101 children were hospitalized for a total of 2,526 days or an average of 25 days each.

While the care of the cripple in this State is under the supervision of the State Board of Health, like all other Federal projects, it is directed from Washington, and certain re-

quirements are made as to the qualifications for the doctors who are doing this class of work, and also certain qualifications for hospital facilities. Patients have been, as far as possible, taken care of within the State, though Sioux City, Omaha, Rochester, and the Twin Cities have cared for some. Usually these are the more difficult plastic cases. I am told there are about 1000 crippled children in the State. About one-third of these have had no treatment. While there is much to be desired in the management of this work, a good start has been made. One of the handicaps that is encountered is the frequent change of personnel in the administrative office, due in part, at least, to the fact that the Superintendent of the State Board of Health is under the direct control of the incumbent Governor, is an appointive office, and is frequently changed by a new Governor, or necessary changes have to be made in the personnel to suit the particular political party that is in power. It would be very helpful to all concerned if the Superintendent of the State Board of Health and his associates could be under Civil Service or some supervision so that they would not be subject to the whims of every new executive.

GUY E. VAN DEMARK, M.D., *Chairman.*

REPORT OF COMMITTEE ON MEDICAL ECONOMICS

The principal work of the Committee on Medical Economics during the past year had been the work on the survey of the need and supply of medical care as initiated by the American Medical Association.

Plans were made and blanks were about ready to be mailed out by the committee when members of the Planning Board called attention to the fact that they were planning a somewhat similar survey and a suggestion was made that we combine this survey and allow the clerical forces of the Planning Board do the actual labor in making the survey and computing the data.

Here the matter rested for a time until it was found, late in the year, that it would be some time before the Planning Board survey could get under way, and in as much as the American Medical Association desired the returns by the time Congress convened, the matter was again taken up by the committee and blanks were sent out. This was done very hurriedly and there was very little response from the forms sent out. The following table will show the number of forms sent and the number returned.

	Number Sent	Number Returned and Used in Study
Physicians and Dentists	400	
Physicians		41
Dentists		8
Hospitals	30	10
Nurses	40	2
Health Departments	20	1
Welfare and Relief	40	1
Schools	285	
Colleges	10	4
Other Organizations	5	
Pharmacists	300	16

The original forms were then sent to the Bureau of Medical Economics and they prepared a preliminary report from the incomplete returns. Because of their incompleteness they have very little value statistically, but probably show a trend.

It would seem that as far as acute illness is concerned, people of South Dakota are being taken care of by the physicians to a large extent at little or no fees from the lower income groups.

There are, undoubtedly, a large number of chronic conditions that need care but are not receiving it.

It would seem that the principal difficulty is the lack of income for a large part of the population in the state.

A large part of the report is taken up with comments obtained from the returns on the unsatisfactory features of the Farmers Aid Corporation set-up due, in large part, to the insufficient funds and lack of understanding of what the program is designed to cover.

From the returns it would seem that the need and lack of supply of medical care to a large extent was a matter of economics and that some provision for adequate income to a large group of families would for most part take care of the discrepancy between the need and supply of medical care.

Considerable more study will be needed to work out satisfactory plans along this line.

REPORT OF COMMITTEE ON RADIOLOGY

The Committee on Radiology is sorry to announce the death of one of its members during the last year, Dr. A. A. McLaurin of Pierre. Dr. McLaurin was always very much interested in the specialty of Radiology and was the one who initiated the round table discussion of Roentgenological interpretation held at our state meetings, which has proven so popular during the last few years.

The Committee urges that the secretary of our association designate a period on the program during the first regular day of our annual meetings, from 4:00 to 5:00 P. M., when interested members may bring their diagnostic film problems for demonstration and consultation to be conducted by someone interested in radiology, visiting or local.

The Committee also urges that all State component societies comply with the desire of the American Society for Control of Cancer to the extent that one of their meetings during the year be devoted to the study and treatment of cancer.

Respectfully submitted,
N. J. NESSA, M.D.
J. L. CALENE, M.D.

REPORT OF COMMITTEE ON BROADCASTING

Please be advised that the Broadcasting Committee is awaiting material to be put on the air. When papers are received from the various members of the State Association, your committee will be ready to function.

Verbal reports have been made, since the end of the broadcasting period in 1936, that broadcasting selected material for the information of the public was of very great value and that it should be continued. Your committee is still of the same opinion.

Very truly yours,
S. M. HOHF, M.D.

REPORT OF COMMITTEE ON NECROLOGY

In submitting the Necrology Report for the past year, we feel it only fitting and proper to pause a moment in our deliberation as a tribute to those gone before. Most of these men were the country doctor type who battled snowdrifts in long forgotten days and sat through many a midnight hour with illness and death as companions. We feel that this unselfish heroism through many years should not pass unrecognized.

We desire to submit the following names: (As nearly as we can find, this list is complete and correct.)

*T. H. BAER, M.D. — Age 64. Born 1874. Graduated University of Iowa, 1902. Practiced in Timber Lake since 1910. Died in Mobridge, July 25, 1938.

*A. E. BROWN, M.D. — Age 75. Born 1863. Practiced in Webster for many years. Died August 4, 1938.

ANDREW HAYDEN, M.D. — Age 75. Born 1862. Practiced in Alcester many years. Died August 21, 1938.

*ROBERT HILL, M.D. — Age 73. Born 1865. Practiced 42 years in Ipswich. Died October 23, 1938.

*ARCHIBALD A. McLAURIN, M.D., F.A.C.S. — Age 62. Born 1876. Practiced for many years in Pierre. Died January 5, 1939.

*GEORGE W. POTTER, M.D. — Age 64. Born 1874. Lived and practiced in Redfield for many years. Died February 15, 1939.

E. V. BOBB, M.D. — Age 64. Former Mitchell, South Dakota resident, died at his home in Alhambra, California, March 4, 1939. Began practicing medicine in South Dakota in 1899. From 1920 to 1924 was Mayor of Mitchell.

*DANIEL L. SCANLAN, M.D. — Age 67. Volga, South Dakota. Dr. Scanlan was president of the South Dakota State Medical Association in 1919 and active in its work for more than 30 years. Died March 3, 1939.

Respectfully submitted,
W. H. SAXTON, M.D., *Chairman.*
R. J. QUINN, M.D.
A. O. CARMACK, M.D.

**Member of South Dakota State Medical Association.*

REPORT OF DR. J. R. WESTABY
Delegate to the American Medical Association
San Francisco Session, 1938

Mr. President, Members of the House of Delegates, Council and Friends.

It is my pleasure at this time to bring to you a short review of the work of the House of Delegates of the American Medical Association in session at San Francisco June 13th to 17th, 1938. All sessions were held in the Empire Room of the Sir Francis Drake Hotel and were held as scheduled, Speaker Dr. N. B. Van Etten presiding.

In addressing the members of the House of Delegates the speaker stated that the American Medical Association was created for the protection of the public from the misrepresentations of Charlatans and Quacks; for the promotion of Science and Art of Medicine, and for the betterment of the public health. Any member of this House had the right to express his views on any subject with the greatest freedom, as delegates you represent your state society and we are glad to have your opinion and council. On your shoulders rests the fate of American Medicine. There are no dictators among the 175 delegates at this meeting and every practitioner of medicine looks to you for guidance and advice. If the American Medical Association is a blundering elephant remember you are riding him.

In the address of the President, Dr. J. H. J. Upham, three impressions were made: *First*, That the general membership of the medical profession were eager for self improvement in the newer developments of medical knowledge. *Second*, There is an awakened interest in our membership in the present social and economic questions confronting the country as a whole and especially those confronting the physician in every day practice. *Third*, There is a greater obligation of medicine and medical practice; because scientific investigations have laid the foundation of preventive medicine, scientific research, public health work, and curative practice.

President-elect Dr. Irvin Abell spoke briefly, urging the members of the association to preserve our system of medical care and at the same time make its benefits available to all classes of our population.

The Secretary, Dr. Olin West, reported that there was an increase of over 4,000 members, making the total for the year up to April 1st, 1938, of 109,435; gross earnings and miscellaneous income were larger than a year ago, while operating expenses were also considerably larger.

A warning was sent out to those state and county societies that might be caught by the Social Security Act, and Income Tax. The fact that state and county medical societies might be liable for taxes under the Social Security Act and were required to prove their right for exemption brought to light the fact that many such associations were unaware of the possibility of a similar tax liability and obligation under the Federal Income Tax Act. *Income Tax Act of 1936*, Section 101, paragraph 6: "Corporations, and any Community chest, fund, or foundation, organized and operated exclusively for religious, charitable, scientific, literary, or educational purposes, or for the prevention of cruelty to children or animals, no part of the net earnings of which inures to the benefit of any private shareholder, or individual, and no substantial part of the activities of which is carrying on propaganda or otherwise attempting to influence legislation." The bureau of legal medicine and legislation has brought this matter to the attention of the State Medical Association and has given them full instructions as to procedure for themselves and their respective County Medical Societies.

Dr. Arthur W. Booth, Chairman of the Board of Trustees, reported that three physicians had been selected as worthy of the Distinguished Service Award of the American Medical Association and asked that a vote be taken by ballot as to the selection of the one to receive the Award. Drs. Simon Flexner of New York, Ludvig Hektone of Chicago, and Rudolph Matas of New Orleans were voted upon and Dr. Rudolph Matas was chosen for the Award.

In the reports of the Board of Trustees, the chairman gave a most interesting detailed report of each of the committees dealing with the general work of the Association, business operations, the *Journal of the American Medical Association*, special Journals, etc.

The Council on Pharmacy and Chemistry reported on their investigations of catgut sutures and Congress, no doubt, established the Institute of Health with laboratories so that national control and regulation of catgut, sutures might insure sterility and high quality material. The sulfanilamide episode also made both council and the profession more alert to the possible dangers in the use of drug products that have been placed on the market without proper scientific investigation and without establishment of the necessary standards.

Federal Legislation has this year enacted the National Cancer Institute Act:

(a) To conduct, assist, and foster researches, investigations, experiments, and studies relating to the cause, prevention and methods of diagnosis and treatment of cancer;

(b) To promote the coördination of researches conducted by the Institute and similar researches conducted by other agencies, organizations and individuals;

(c) To procure, use and lend radium, as hereinafter provided;

(d) To provide training and instruction in technical matters relating to the diagnosis and treatment of cancer;

(e) To provide fellowships in the Institute from funds appropriated or donated for such purpose;

(f) To secure for the Institute consultation services and advice of cancer experts from the United States and abroad; and

(g) To coöperate with State health agencies in the prevention, control, and eradication of cancer.

An Act authorizing the Bureau of Mines to manufacture and sell helium gas for medicinal and other uses and an act devolving on the Federal Trade Commission, jurisdiction over the advertising of foods, drugs, diagnostic and therapeutic devices and cosmetics.

The address of Josephine Roche, Chairman of the Interdepartmental Committee to coördinate Health and Welfare Activities with the Federal Government was read by Dr. Warren F. Draper of the United States Public Health Service:

In the creation of the Interdepartmental Committee in 1935 following the passage of the Social Security Act, President Roosevelt designated the assistant secretaries of four government departments: The Treasury, Interior, Agriculture and Labor, acting with the chairman of the Social Security Board. A national survey was made and conclusions drawn that there existed grave and far reacting needs, because of unemployment, starvation wages, indecent housing and utterly inadequate food conditions, and causing economic waste.

The reports claimed that on an average day of the year, there are four million or more persons disabled by illness, and that in a year a quarter million women do not have the advantage of a physician's care at delivery, 15,000 being delivered by neighbors or relatives, and 223,000 by midwives, most of whom were untrained and ignorant; 40,000 young adults die of tuberculosis yearly; and an increasing annual disability due to untreated sick persons is demanding concerted action on the part of the public for satisfactory solution.

The National Health Conference at the suggestion of the President is inviting representatives of the interested public and of the medical and other professions to examine the health problems in all their major aspects and to discuss ways and means of dealing with these problems.

The National Health Conference was called for July 18th at Washington, D. C., and a committee from the House of Delegates invited to attend.

Dr. W. F. Braasch, Chairman of the Committee on Medical Care, challenged the report of the Interdepartmental Committee and no time was lost in seeking more accurate survey through a nation-wide survey of the actual supply of medical care. This information has been sought through the local district medical societies and the reports sent to the State Chairman and then to Dr. Braasch.

The survey of need for medical care in the United States has been most carefully done and reports show that fully 90 per cent of all sick persons *are* attended by physicians, and the other 10 per cent either did not seek medical aid or were attended by other practitioners of the healing arts.

Reports on international morbidity and mortality rates, rank

the United States as one of the most healthful countries in the world.

Thorough investigation into all the new forms of medical practice has produced sufficient evidence on practically every scheme for organizing medical services to disprove the claim that some organizational arrangement can lower the cost of good medical service. Certainly no system of collecting payments for medical care can lower the average cost of $25 to $30 per person annually.

RESOLUTIONS

Resolutions Requiring of Foreign Graduates Full Citizenship in the United States.

Dr. William R. Molony, Sr., California, presented the following resolutions, which were referred to the Reference Committee on Medical Education: (61)

Whereas, the license to practice medicine and surgery in many countries is limited strictly to citizens of these countries; and

Whereas, In addition to holding full citizenship, each applicant is required in several of these countries to show that his medical education was pursued and completed in said countries; and

Whereas, Many foreign graduates in medicine and surgery in increasing numbers are seeking admittance to the practice of medicine in these United States; and

Whereas, In order to convey adequately to these applicants a full and satisfactory knowledge of the American conception of patriotism and of ethical ideals in medicine, it is necessary that a period of residence be required; therefore be it

Resolved, That in addition to the requirements for foreign graduates, as outlined in a resolution adopted by the House of Delegates for the American Medical Association in 1936, it is highly desirable that an additional requirement of full citizenship in the United States of America be demanded; and be it further

Resolved, That the House of Delegates of the American Medical Association approve the foregoing and that a copy be sent to the properly constituted officers of each examining board of the United States and to the Federation of State Medical Boards, with the request that they consider seriously urgent need for the adoption of such rules and/or legislation necessary to put the purposes of these resolutions into effect.

Resolution Dealing with Alcoholic Intoxication.

Dr. Thomas F. Thornton, Iowa, presented the following resolution, which was referred to the Reference Committee on Miscellaneous Business: (77)

Whereas, The medical and legal professions, the courts and the public have been repeatedly unable to determine legally the sobriety or the degree of intoxication of individuals accused of violating the established rules and laws of safety; and

Whereas, Such inefficient methods of clinical and laboratory diagnosis and legal procedures are unscientific and a direct cause of much unnecessary expense, litigation and suffering and directly encourage minor verdicts for major offenses; therefore be it

Resolved, That the executive council of the Iowa State Medical Society ask the coöperation of the American Medical Association in a study looking toward the determination of definite, legally acceptable, scientific clinical and laboratory tests for alcoholic intoxication by

1. Studying and recommending such clinical and laboratory tests as have proved successful in Europe and in this country;
2. Prescribing a standard of qualifications of the persons, laboratories and hospitals taking and making these tests;
3. Suggesting such legislation as may be necessary to establish these clinical and laboratory tests;
4. Coördinating the medical and legal profession with the various police agencies and safety councils in this activity; and
5. Suggesting adequate financial support from such funds as may be available from the liquor license tax or elsewhere to supply equipment necessary to taking and making such tests.

Resolution from the Section on Ophthalmology Dealing with Visual Standards for Operating Motor Vehicles.

Dr. Arthur J. Bedell, Section on Ophthalmology, presented the following resolution, which was adopted on motion of Dr. Bedell, seconded by Dr. Charles H. Goodrich, New York, and Dr. W. Albert Cook, Oklahoma, and carried after discussion by Dr. J. R. Westaby, South Dakota, and Dr. Bedell:

Whereas, For many years state licensing boards have asked for official visual standards for operating motor vehicles; and

Whereas, A committee of the Section on Ophthalmology of the American Medical Association has had this problem under serious consideration for many years and has made its report; and

Whereas, This report was accepted by the Section on Ophthalmology of this Association; and

Whereas, The delegate of the section was directed to present this report to the House of Delegates; be it

Resolved, That the following be accepted as the approved American Medical Association standards:

A. *For an Unlimited License:*
   1. Visual acuity with or without glasses of 20/40 Sn. in one eye and 20/100 Sn. in the other.
   2. A form field of not less than 45 degrees in all meridians from the point of fixation.
   3. The presence of binocular single vision.
   4. Ability to distinguish red, green and yellow.
   5. Night blindness not to be present.
   6. Glasses when required be worn while driving and those employed in public transportation be provided with an extra pair.

B. *Visual Standards for Limited License:*
   1. Visual acuity of not less than 20/65 Sn. in the better eye.
   2. Field vision of not less than 60 degrees horizontally and 50 degrees vertically from point of fixation in one eye.
   3. Diplopia not to be present.
   4. Glasses to be worn when prescribed.
   5. Coördination of eye, mind and muscle to be fully adequate to meet the practical visual road tests.
   6. A limited license not to be issued to those employed in public transportation.

C. *Renewals, Retesting and Reëxaminations:*
   1. Renewals of license to be issued at least every third year. The applicant shall with each renewal make a declaration that he knows of no visual defect which has developed during the past year.
   2. Retesting of acuity to be made at least every six years.
   3. If any visual defects have developed, and examination by an ophthalmologist and the report thereof, to be required before reissuing the license.
   4. License to state thereon the specific limitation for driving.

ELECTION OF OFFICERS

Dr. Rock Sleyster, Wauwatosa, Wisconsin, was nominated for president-elect and given no opposition.

Dr. Howard Morrow of San Francisco was chosen vice-president.

All other officers were reëlected except the speaker of the House of Delegates who wished to retire from office while still warm.

Dr. H. H. Shoulders, the vice-speaker, was elected speaker.

The place of annual sessions for 1939, 1940 and 1941 were chosen by ballot: St. Louis for 1939, New York for 1940 and Cleveland for 1941.

REPORT OF SPECIAL SESSIONS

A Special Session of the House of Delegates was called at Chicago September 16th, 1938, for consideration of the National Health Program submitted to the National Health Conference held in Washington, D. C., July 18th, 1938.

This program was set forth and largely supported by representatives of various governmental departments. The representatives of the American Medical Association were not consulted about the program or asked to present alternative programs. It was a single proposal on which the chairman sought approval for legislative purposes.

President Dr. Irvin Abell's address was in defense of the traditional ethics of the profession which have maintained our high standards on such noble principles. He pointed out the indefiniteness of the National Health Program and the absence of opportunity for presentation of alternative proposals or any detailed discussion of any part of the plan the American Medical Association wished to present, one of which was the need for a Cabinet office of Health and Medical Service. Dr. Abell discussed the unfair picture painted by speakers of the National Health Conference. America was depicted as a nation

one third ill fed, housed and cared for in health, dying in numbers for lack of our services.

After considerable discussion by delegates from many states, five committees of five members each were appointed to consider the five divisions of the National Health Program and to bring in reports to the House as soon as possible.

REPORT OF DIVISION 1—*Public Health.*

The Committee recommended:

1. The establishment of a Department of Public Health with a secretary who shall be a doctor of medicine and hold a seat in the President's Cabinet.
2. The endorsing of the general principles outlined by the Technical Committee for the expansion of the Public Health Service
3. All programs for expending sums of money should be expended by state health departments, approved by the proper committees of the State Medical Association
4. All expenditures of public funds made for the treatment of individuals should be limited to the indigent

REPORT OF DIVISION 2

The Committee favored expansion of hospital facilities where actual need exists.

Use of private and proprietary hospitals to solve problems for the indigent when possible

REPORT OF DIVISION 3—*Medical Care of the Medically Needy.*

The Committee recommends:

1. The maintenance or extension of constantly improving sickness service to the indigent
2. Clear understanding on the part of the public at all times of the local needs for medical service, the responsibility for its delivery, the actual expense involved for such service, as well as the source and distribution of the funds in payment for such service
3. Complete separation at all times from the influence of partisan politics

REPORT OF DIVISION 4—*Ways to Assist in the Care of the Needy.*

The Committee approves the principle of:

1. Hospital service insurance.
2. Workmen's compensation laws
3. Voluntary indemnity insurance to finance sickness costs without subsidy

The Committee opposed all forms of compulsory health insurance with its inevitable accompaniments of government subsidy and control

REPORT OF DIVISION 5—*Compensation for time lost by Sickness*

The Committee endorses the proposition that compensation for loss of wages due to sickness would have a distinct influence toward recovery of those disabled and should in a measure reduce permanent disability

To facilitate the accomplishments of the objectives of the various divisions with recommendations of the Committees seven physicians were appointed by the speaker under the Chairmanship of President Dr Abell to confer and consult with the proper federal representatives relative to proposed National Health Program

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REPORT OF THE PRESIDENT OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION

J. F. D. Cook, M.D.
Pierre, South Dakota

To the Officers, Councilors, and Delegates of the State Medical Association in Session at Aberdeen, South Dakota, April 24, 25 and 26, 1939.

I regret that circumstances have developed that make it impossible for me to be present. Conflicting dates with the United States Public Health Meeting, Washington, D. C., with Surgeon General Dr. Parran, April 20th through the 26th, 1939, prevent my attendance. Since as Superintendent of the State Board of Health, it is required that I attend the Washington meeting, I am asking Dr. Shirley to present this, my report.

As your President, invitations were received from Yankton, Aberdeen, Pierre, Whetstone Valley, and Madison District Medical Societies. It is anticipated that the Councilors will make reports of their activities.

I take this opportunity, through the assistance of Dr. Shirley, of thanking you for your bearing with my feeble efforts. Your coöperation in our legislative activities has been very helpful, and the tentative program speaks for a successful and profitable scientific season.

1939 Legislature. The session opened with a well qualified personnel in the Public Health Committee of the House and Senate. The Public Health Committee in the House had for its chairman, Reverend Hove. It also included Dr. Mills of Wall, Mr. Lothrop of Aberdeen and other members. The Senate Public Health Committee had for its chairman, Mr. Stavig of Rosholt in Roberts county, Reverend Johnson of DeSmet, Odell, McHugh, Monson and others.

The Basic Science Bill was introduced early and was designated as House Bill No. 10. This bill was introduced as drawn by the Honorable Karl Goldsmith and as approved by the Council.

The osteopaths and chiropractors had introduced House Bill No. 47 entitled, "An Act to Regulate the Distribution and Participation in the Disbursement of Funds Allotted for Any Public Health Program. To Prevent Discrimination in the Rights of Clients or Citizens Participating in Such Public Health Program to Choose Any Licensed Physician or Licensed Practitioner of the Healing Arts to Render Services Provided by Such Public Health Program and Providing a Penalty." This act amended the 1937 law. However, in this we were able to exempt, by amendment, all funds pertaining to the Crippled Children Program.

House Bill No. 47 and House Bill No. 10 were duly adopted. The Osteopathic Surgery Bill No. 24 was lost. Senate Bill No. 218 which was introduced by the chiropractors, raised their standard of qualifications to a high school course and four years of college. This was passed by the House and Senate.

An interesting bill appeared in the Senate: Senate Bill No. 154. This bill was to amend Section 27.1081 of the 1939 Code. This bill would place the appointment of the County Boards of Health in the hands of the County Commissioners. This proposed bill, if enacted and became a law, would completely upset the State Board of Health's control over the reporting of communicable diseases and other health matters that might obtain in the political subdivisions of our state. It would also completely disarrange any program that we might have in coöperation with the United States Public Health Service. The bill failed to receive a committee report.

The Public Health Committee of the House, under the direction of Reverend Hove and Dr. Mills was able to report to the House, and with very little discussion passed the House and presented to the Senate for their adoption, two bills in support of a venereal disease pro-

gram. These were House Bills 247 and 248. House Bill 247 proposes to require every physician attending a pregnant woman to take or cause to be taken a sample of her blood at the time of the first examination and to submit such sample for standard serological tests for syphilis to the State Health Laboratory of the State Board of Health or such other laboratories as are approved by the State Board of Health. House Bill No. 248 proposes to require as a condition precedent to the issuance of a license to marry that both parties to a proposed marriage present a certificate from a licensed physician that they are either free from syphilis or not in a stage of the disease whereby it may become communicable, as nearly as can be determined by a thorough physical examination and such standard microscopic and serological tests as are necessary for the discovery of syphilis. House Bill No. 248 as passed by the House and Senate came to the desk of Governor Harlan J. Bushfield. The Governor called me to his office for consultation over this bill. It appeared that he had received considerable comment proposing to veto this bill. He said he noticed that the bill did not carry any fee schedule. If a schedule had been proposed by the proponents of the bill, it was deleted before it came to the House. I was of the opinion and had the understanding that a fee schedule would be proposed in the bill. The Governor wanted me to make a statement as to what the usual fee would be for procuring the blood for a serological test. After some discussion, I promised the Governor that I would ask the Council and House of Delegates of the State Medical Association to adopt a fee schedule of two dollars ($2.00) for the procuring of the blood for serological examination which was to be sent to the State Laboratory. He understands that any further physical examination requires subsequent fees. I hope that the Delegates will approve of such a fee schedule to coöperate in the carrying-out of this program.

Reverend Hove and Dr. Mills are to be commended for their activity in presenting and enacting such constructive public health measures.

House Bill No. 78 amended the Compensation Act, raising the maximum fee for hospital service and other expenses to two hundred dollars ($200.00), and left the medical and surgical services at one hundred dollars ($100.00). The efforts of the Hospital Association were instrumental in bringing about the enactment of this bill.

I want to call your attention to House Bill No. 313 which was the General Appropriation Bill. The State Board of Health appropriations were materially reduced from fifty-seven thousand, twenty-five dollars ($57,025.00) per year to fifty thousand, two hundred dollars ($50,200.00) per year, making a reduction of six thousand, eight hundred and twenty-five dollars ($6,825.00). I might say that the economy program was evident throughout all departments of the state. One particular item, the item of twenty-five thousand dollars ($25,000.00) for crippled children, was recommended at five thousand dollars ($5,000.00). However, we were able, through our friends, to raise this appropriation back to the original twenty-five thousand dollars ($25,000.00).

Senate Bill No. 16 was an amendment to the old beer law and the passage of this bill means that the hospitals will continue to enjoy the benefits of the beer fund for at least another two years.

The members of the legislature are to be commended for their activities in the constructive public health legislation; Honorable Karl Goldsmith for his efficient and gentlemanly conduct of activities in behalf of our sponsored legislation. He gave untiringly of his time and advice on all matters; Dr. Mills of Wall, who was in my opinion, a most valuable member in the House by his efficient untiring efforts in the legislature. He was on the floor at all times and nothing escaped his notice that was in line of constructive legislation.

RECOMMENDATIONS

That the Council make contact with Honorable Karl Goldsmith and consider employing him as a legal councilor for the Medical Association on an annual basis.

Basic Science Law (Board Provisions). The House of Delegates should choose two or more names of physicians to be presented to Governor Bushfield from which he may select one physician to be appointed on the Basic Science Board. Also, two or more names of professors to be presented to Governor Bushfield from which he may select one to be appointed on the Basic Science Board. I am enclosing a copy of the Basic Science Law for your information.

The one hundred dollars ($100.00) allotted to me was spent as any Scotchman would have done and if requested by the Secretary-Treasurer, I will give an itemized account.

It is with regret that I am not able to be with you and take all the "heat" that you may be able to produce. Thank you, again, for your coöperation.

ADDRESS OF THE PRESIDENT-ELECT OF THE SOUTH DAKOTA STATE MEDICAL ASSOCIATION*

J. C. Shirley, M.D.
Huron, South Dakota

The medical profession in the state of South Dakota has just passed through one of the most significant years in its history, under the guidance of its President, Dr. J. F. D. Cook. The year was significant in that a legislative program was successfully carried through that will aid in protecting the public from undesirable and unqualified practitioners of the healing art. The basic science law, which was passed in the last legislative session and bitterly opposed by those who had only selfish interest to serve, showed that things can really be accomplished. It is all the more significant at this time because in the minds of many the medical profession is on trial nationally.

Like individuals in other organizations, some medical men have become dissatisfied with attempts made to improve conditions and have withdrawn their support from their local society in a misguided attempt to voice

*Read before the South Dakota State Medical Association, April 24, 1939, Aberdeen.

a protest, thus weakening the only force available to correct unsatisfactory conditions. To have an effective and worthwhile force, it is imperative that we have an objective that will merit support and a membership of interested, aggressive individuals composed of nearly 100 per cent of those eligible for membership. The year's efforts have demonstrated that the State Medical Association is capable of representing its members and has placed those who remain outside of the Association in the position of asking for a free ride.

It is also apparent that the efforts of the Allied Council are exerting greater influence on subjects related to public health and the problems affecting the practice of medicine.

One point should be emphasized, and that is that the medical profession is not unanimous in its political affiliations and, therefore, matters of a partisan nature should have no part in our program.

With the changes due to social unrest, there is a tendency to the development of a socialistic attitude toward medical care, simply one aspect of a growing social conscience. We, as physicians, cannot disregard this tendency and we must recognize that there are definite problems in regard to furnishing adequate medical care to all of our people. Medical men are conscious of these needs and stand ready to take the lead in working out a just and fair solution after due and deliberate study. I think that we must maintain the same scientific attitude toward these problems that we have had to develop in regard to innovations in scientific medicine. That is, a perfectly open mind but constantly and severely critical, for, in the long run, this attitude will probably prove to be the most humanitarian.

We hear a great deal about the cost of medical care, but very little about the cost of adequate medical care. Studies have indicated that the American people spend about as much for tobacco as they do for medical care. It is generally recognized that the problem is not the total cost but distribution of the cost. It is said that the majority of illness is self-limiting and can be very well cared for in the home at a comparatively low cost. On the other hand, something like 20 per cent of illness is serious enough to require hospital care, and it is said that this 20 per cent accounts for something like 80 per cent of the total cost. This means that, at present, illness is something which a family cannot provide for in a yearly budget. One year they may get by with practically no expense, only to be faced by a very heavy expense another year. One solution to this problem that is offered is some form of insurance, and some hospitals are now providing hospital care on something like an insurance basis. That is, the family pays a certain amount each month and the hospital agrees to furnish the care that is needed. In most instances this provides for hospitalization only and does not include physicians' fees. This scheme is in use in many cities and has the endorsement of some of the medical organizations. But you must remember that voluntary insurance is one thing and compulsory health insurance is an altogether different thing.

Compulsory insurance is one of the things which we are beginning to hear about, and there are many dangers connected with it. In the first place, it is apt to mean that we have either a corporation or the government engaged in the practice of medicine, and the scheme dictated by lay individuals who can have no real knowledge of the problems. Incidentally, no one is competent to say what constitutes adequate care in a given case except a physician who is on the scene at the time. The only alternative is voluminous detailed reports, and is another of the faults of health insurance. It means that doctors become so busy filling out blanks that they have no time to care for people who are sick. Efficiency experts can tell you how many patients you should see in a day and how much time you should spend on them. At the end of the day you would have neither time nor inclination for the study of new developments in medicine or for careful thought which you would otherwise give to such things as the problems of diagnosis and treatment of some of the cases that have puzzled you during the day. Health insurance has been shown to definitely increase loss of time through illness, partly because of better care, perhaps, but also from the inevitable inborn tendency to chisel. One of the other serious problems involved in any scheme to furnish medical care on an insurance or salary physicianed basis is that it is very likely to break up the long cherished association between the family physician and his patients. One of the first principles of a program of adequate care must be to preserve a free choice of his physician by the patient. Anything else amounts to the worst form of regimentation.

What constitutes adequate care? That in itself is worth a little study. The report of President Roosevelt's committee to study the need for a Federal Health Program starts out by saying, "The general level of health in the United States is higher than at any other time in history"; and according to one of the Washington correspondents, it might have added, "or in the history of any other nation in history." The average life span has been increased many years, so it may be that the need for any new measures has been exaggerated. The average physician willingly donates a fair proportion of his time to the care of the indigent, but it is true that there are problems that arise where that is not enough. The science of medicine is of course making wonderful strides, and we are all proud of that fact. Think of insulin, scarlet fever serum, liver extract, and now sulphanilamide. They have all come into use within the last fifteen years—greater knowledge in surgical diagnosis and more exact application of delicate surgical technique—along with hundreds of less important things. But the fact is, that in most instances these new weapons are expensive to use although they are a great aid in caring for the sick.

For instance, consider the Drinker Respirator, which is used in a few cases of infantile paralysis. A hospital or a physician may actually need such equipment only once in five years, and yet the equipment cost something like $2,000.00. This particular problem has been recognized and the American Legion has put several of these Respirators in hospitals in the State. That is a

spectacular problem—one that has been given some publicity, but there are other such as pneumonia serum, which may cost from $40.00 to $60.00 for the treatment of one patient. In one instance of which we know, tetanus serum costing something like $400.00 was used on one patient, and a life was saved. A great many of the things which modern medicine has made available are very expensive. Radium and deep X-ray therapy for cancer is another instance.

Any program which attempts to provide medical care must provide for all of these things. Otherwise, it does not benefit the people at all. It may give the physician a few dollars for work which he would have otherwise donated, but so far as the public is concerned, no one has benefited.

Some form of voluntary health insurance with government agencies, local, state, and federal, participating with the recipient in the premium payments, may be needed. The recipients in this plan would have to be those included in the lower income group, and it would have to be arranged so that the actual management would remain in the hands of the doctors themselves.

In our state we have a group of men who, through necessity, have become rather efficient administrators of relief. They are the County Commissioners. I think that, on the whole, they have done well in providing medical care for the poor, considering the very meager funds available to them. If we are to have grants from the government to help provide such medical care, then allotments to the County Board might be a sensible way to begin. Indeed, it might go a long way toward solving the problem.

It is not my purpose to go into a discussion of the merits or demerits of our own FAC program—you are as familiar with them as I am. But, it must be remembered that on our part, at least, it was intended only as an emergency measure to provide care for an indigent group. In theory it does fulfill some of the conditions of a program of adequate care. It maintains the free choice of the physician by the patient and it is entirely voluntary on the part of the patient. However, it has taught us that not even emergency care can be provided to an unselected group for the monthly fee that was established.

In these days of rapid change we can easily lose our perspective and forget that there are fundamentals which do not change. In time of need people will always want what they believe to be the very best medical care available to them. We know, and most of them know, that in the great majority of cases this can best be provided by the family physician in the home or office. It is our duty to see that propagandists do not mislead the public into thinking otherwise.

In conclusion may I quote the following from an editorial in the *American Journal of Surgery*: "To one who has been active in the ranks for over thirty years, a longing fills the heart for the old order of two decades or more ago when the primary thought in the minds of physicians was to care for the sick and advance the science of medicine. Perhaps the world has already moved to the point where change in administration has become inevitable, but we can hope that primary aim will remain the central governing thought of the medical profession.

At any rate, we must assure ourselves that medicine will remain in the control of the physician. We must not be forced to transfer our professional birthright to politicians, to large foundations or to physicians who have never devoted ten minutes to the actual practice of medicine. We know that we must meet the economic needs of the times, and, after due and deliberate study and discussion, we shall do so. But we must also stand shoulder to shoulder, yielding no infinitesimal part of our heritage, allowing no outsiders to regulate and control our profession.

Are we to have socialized medicine, health insurance, or some form of government control? Are we to turn haphazardly to rapidly brought out schemes? Let the doctors speak, through their representative organizations, to retain for the practicing profession the control of the practice of medicine. A resolution for all of us for 1939—in the words of the Constitution of the American Medical Association—to 'promote the science and art of medicine and the betterment of public health.' "

SOUTH DAKOTA STATE MEDICAL ASSOCIATION ROSTER--1939

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Bates, W. A. ..... Aberdeen
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Kraushaar, J. F. O. — Aberdeen
Kemper, C. E. — Viborg
Lamb-Barger, Hazel — Sioux Falls
Lanam, M. O. — Sioux Falls
Lemley, R. E. — Rapid City
Lenz, B. T. — Huron
Leraan, L. G. — Sioux Falls
Lietzke, E. T. — Beresford
Lloyd J. H. — Mitchell
Lovre, S. C. — Humboldt
Lowe, C. E. — Mobridge
Lacey, V. I. — Yankton
Mabee, O. J. — Mitchell
Madsen, Mars L. — Canova
Magee, W. G. — Watertown
Malster, R. M. — Carter
Mannion, J. E. — Gregory
Martin, H. B. — Harrold
Matlock, N. E. — Deadwood
Mattox, N. E. — Lead
Maxwell, R. T. — Clear Lake
Mayer, R. G. — Aberdeen
Maytum, W. J. — Alexandria
McCarthy, P. V. — Aberdeen
McDonald, C. J. — Sioux Falls
McGreevy, J. V. — Mitchell
McIntyre, P. S. — Bradley
†Miller, E. C. — Brookings
Miller, H. A. — Brookings
Mills, G. W. — Wall
Minty, E. W. — Rapid City
Minty, F. W. — Rapid City
Moe, A. J. — Sioux Falls
Mokler, V. A. — Wentworth
Moore, F. A. — Yankton
Morehouse, E. M. — Yankton
Morseman, C. F. — Hot Springs
Morrissey, M. M. — Pierre
Mullen, R. W. — Sioux Falls
Murdy, B. C. — Aberdeen
Murphy, Jennie C. — Yankton
Murphy, Joseph — Murdo
Murphy, T. W. — Bristol
Muggly, J. A. — Madison
Murdy, Robert — Aberdeen
Neisius, F. A. — Platte
Nelson, J. A. — Howard
Nessa, N. J. — Sioux Falls
Newby, H. D. — Rapid City
Nilsson, F. C. — Sioux Falls
Northrup, F. A. — Pierre
Nauman, E. C. — Rapid City
Newkamp, Hugo — Hosmer
Ohlmacher, J. C. — Vermillion
Opheim, O. V. — Sioux Falls
O'Toole, T. F. — New Underwood
Overton, R. V. — Winner
Olson, C. L. — McIntosh
Pangburn, M. W. — Miller
Pankow, L. J. — Sioux Falls
Parke, L. L. — Canton
Peabody, P. D., Sr. — Webster
Peabody, P. D., Jr. — Webster
Peeke, A. P. — Volga
Pemberton, M. O. — Deadwood
Pearson, A. W. — Sisseton
Pfister, F. A. — Webster
Pittenger, E. A. — Aberdeen
*Perkins, E. L. — Sioux Falls
*Posthuma, Anne — Sioux Falls
Quinn, R. J. — Burke
Ramsey, Guy — Philip
Randall, O. S. — Watertown
Ranney, T. P. — Aberdeen
Reagan, R. — Sioux Falls
Reding, A. P. — Marion
Reib, Wm. G. — Parkston
Rice, D. B. — Britton
Rider, A. S. — Flandreau
Riggs, T. F. — Pierre
Robbins, C. E. — Pierre
Rudolph, E. A. — Aberdeen
*Roberts, W. P. — Sioux Falls
Richards, F. A. — Sturgis
Rousseau, M. C. — Watertown
Salladay, I. R. — Pierre
Sarchet, Geo. A. — Mobridge
Saxton, W. H. — Huron
Saylor, H. L. — Huron
Scallin, Paul R. — Redfield
†Scanlan, D. L. — Volga
Schmidt, Hilmer — Petersburg, Va.
Searles, E. K. — Brookings
Sewell, H. D. — Huron
Sherwood, C. E. — Madison
Sherwood, J. V. — Sanator
Sherwood, H. W. — Doland
Shirley, J. C. — Huron
Smiley, J. C. — Deadwood
Smith, A. J. — Yankton
Soe, Carl A. — Lead
Spain, M. L. — Hot Springs
Spirey, A. W. — Mobridge
Stenberg, E. S. — Sioux Falls
Stansbury, E. M. — Vermillion
Stewart, J. L. — Nemo
Stevens, G. A. — Sioux Falls
Stevens, R. G. — Sioux Falls
**Searles, E. R. — Brookings
Sercl, W. F. — Sioux Falls
Schuchardt, I. — Aberdeen
Stewart, N. Wells — Lead
Tank, M. C. — Brookings
Tillisch, Henrick — Brookings
Tobin, F. J. — Mitchell
Torwick, E. T. — Volga
*Torwick, E. E. — Volga
Trierweiler, J. E. — Yankton
Triolo, Anthony — Rapid City
Tschetter, J. S. — Huron
Tschetter, Paul — DeSmet
*Tarbell, H. A. — Watertown
Totten, F. C. — Lemmon
Tobin, L. W. — Mitchell
Van Demark, G. E. — Sioux Falls
Vaughn, J. B. — Castlewood
Volin, H. P. — Lennox
Vollmer, F. J. — Howard
Watson, E. S. — Estelline
Weber, R. A. — Mitchell
Weishaar, C. H. — Aberdeen
Westaby, J. R. — Madison
Westaby, R. S. — Madison
Whiteside, J. D. — Aberdeen
Whitson, Geo. E. — Madison
Willhite, F. V. — Redfield
Wilson, F. D. — Winner
Wright, O. R. — Huron
Williams, F. E. — Wakonda
Willoughby, F. C. — Howard
Wexler, M. R. — Watertown
Young, E. M. — Mitchell
Zimmerman, Goldie — Sioux Falls
Zachritz, G. F. — Faulkton
Zellhoefer, H. W. K. — Sioux Falls

* *Honorary.* ** *Associate.* † *Deceased.*

Ectopic Pregnancy*

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IN the preoperative period of medicine, the diagnosis of ectopic pregnancy was usually made at the postmortem table. The mortality rate at that time varied from 65 to 95 per cent. Those women that were fortunate enough to have encapsulation take place or hematoceles develop would possibly survive. With the advent of surgery, there still remained several schools of thought concerning the treatment of ectopic pregnancy. At that time, there were probably more advocates of nonsurgical than surgical management. Hunter Robb, experimenting on normal pregnant dogs, found that when the ovarian artery was cut, the dogs did not die of hemorrhage, and he became one of the strongest advocates of nonsurgical treatment. The nonsurgical management at that time consisted of various methods of treatment. One method was the use of electricity. The galvanic current was introduced for the purpose of destroying the life of the fetus, thus terminating the pregnancy. Another method was that of killing the fetus by morphine injections. The first operations for extra-uterine pregnancies were performed in 1878. Today, of course, the treatment is entirely surgical, with a mortality rate ranging from four to eight per cent.

Although ectopic pregnancy is not a rare condition, the diagnosis is frequently incorrect. This is due to the fact that no one test or symptom makes the diagnosis. Cases are often diagnosed as appendicitis, salpingitis, or twisted ovarian cyst. The majority of extra-uterine pregnancies are in the tubes. The ovarian and abdominal pregnancies are so rare that they need not be discussed here.

When a patient has a previous pelvic inflammatory history, has missed one or two menstrual periods, is spotting, has abdominal-pelvic pain, a unilateral adnexal mass, and is in severe shock, the diagnosis is quite evident. As stated above, the majority of cases are not this simple. However, the most important and constant but by no means invariable symptoms are pain, vaginal bleeding and shock of some degree. It will be observed that all these are symptoms of disturbances of the pregnancy, and these, along with certain laboratory and physical findings will help in our diagnosis of the atypical cases.

In mentioning these tests and their value, one must first state that the pelvic examination often reveals nothing of importance, as a mass, if present at all, varies in size and firmness. However, palpation of the cervix and uterine body causes considerable pain to the patient. In most cases, a tender mass may be palpated, and in a very few cases, pulsation may be felt. Therefore, although the physical examination is important, it is also confusing excepting in cases where an adnexal mass may be felt (a typical history), and signs of pregnancy noted. The temperature and pulse rate are not of great value. The temperature, usually not high, generally varies within the range of other common conditions, such as salpingitis and subacute appendicitis. The blood count is not always of much help. The red blood count is not greatly affected except by severe rapid hemorrhage, and the white count does not show much increase with small hemorrhages. While it is true that massive hemorrhage results in high leucocytosis, and lowered red blood cell count, the effect of such change on the patient's general condition would be evident without either a high white count or a low red count.

The sedimentation test may be of considerable value in differentiating an ectopic pregnancy from an inflammatory process of the pelvis. A sedimentation time of less than 30 minutes is a good indication of an acute inflammatory process, except in cases of infected hematoceles, while a sedimentation time of 60 minutes or over would favor an ectopic pregnancy. "Cullen's sign," a bluish-black discoloration about the umbilicus, is inconstant, and if not present, does not necessarily mean that there is no pregnancy. Blood pressure readings express a degree of shock and cannot be relied upon too greatly, as the blood pressure may not fall until the patient is in critical condition.

The hormonal test for pregnancy, in the majority of cases, is not of great value, as most of the cases are purely emergency. If the hormonal test is positive, it does not indicate whether the pregnancy is extra-uterine or intra-uterine. If the test is negative, it does not rule out extra-uterine pregnancy, as there may have previously been a death of all embryonal elements. Pathological examination of intra-uterine decidua may be suggestive but not conclusive. In ectopic pregnancy, one does not find any chorionic elements in the decidua. However, the absence of chorionic elements does not necessarily rule out intra-uterine abortion, because in intra-uterine abortion, so much degeneration may take place that it is impossible to recognize the chorionic elements.

Aspiration of the posterior cul-de-sac by way of the vagina many times will give an added help in diagnosis, and if blood is aspirated, a laparotomy should be done at once. The aspiration is a relatively simple procedure and in many cases, along with other findings, will establish the diagnosis. Of course, there is some danger of infection occurring, and this should not be done as a routine measure.

One method that is being used in very questionable cases is visualization of the peritoneal cavity. This is done by means of the peritoneoscope. The procedure is not intended to replace surgery, nor to be used as a short-cut in making the diagnosis, but has its definite indications in differential diagnosis.

While ectopic pregnancy is definitely a surgical condition, the technic of operating is one of considerable im-

*Presented at the annual meeting of the North Dakota State Medical Association, Bismarck, May 18, 1938.

portance, and of some difference in opinion. The abdominal route is the accepted method, although some men are removing the tube by the vaginal route, which is a very difficult procedure. In operating for ectopic pregnancy, judgment of what tissue to be removed is a matter of importance. If only the offending tissue is removed, one must remember that the same process that caused the original trouble may act again on the opposite tube. The figures of Smith, who has collected valuable statistics on this point, show that only about 33 per cent have normal uterine pregnancies later, and about 15 per cent have a repeated ectopic pregnancy. The question, therefore, of saving or removing the other tube is often an important one, and must be answered as many others in pelvic surgery, taking into consideration the age of the patient, her desire for children, etc. Of course, in serious cases, one must do only enough to stop the hemorrhage.

Fever often marks the postoperative course, which in the absence of peritonitis may be due to the intraperitoneal blood. However, it is perfectly safe, after removing the clots, to leave the free blood in the peritoneal cavity, to be reabsorbed and used again. Theis suggested collecting the blood from the peritoneal cavity, defibrinating it, mixing it with Ringer's solution, and re-injecting it into the veins of the arm. Of course, it is advisable to defer operation in very serious cases long enough to transfuse or give other supportive treatment in order to lessen the risk of operation. In hospitals where blood banks are maintained, it is possible to transfuse before, during and after the operation.

In conclusion, one may summarize these points by saying that:

1. Ectopic pregnancy is not a rare condition, but a very interesting one.
2. The diagnosis is especially difficult.
3. Diagnosis cannot be made from any one sign or symptom.
4. A very careful history is of greatest importance in making the diagnosis.
5. Ectopic pregnancy should always be kept in mind in diagnosing acute abdominal cases.

Annual Report of the Eye Health Committee of the American Student Health Association

Just one year ago the Eye Health Committee presented its first annual report at the meeting of the American Student Health Association in Chicago. At that time we tried to emphasize the importance of the problem of vision conservation which affects over a million college students annually. Sydenstricker and Britten[1] have shown that the highest incidence of visual defects occurs in professional people. Boynton[2] has shown that not only do students enter college with a higher incidence of visual defects than their contemporaries in age who go into the industries, but that during the college career, about one in six of those entering with presumably good vision will need glasses before graduation, and, during the college course one in eleven of the same group will suffer a serious loss of visual acuity. Ferguson[3] reports persistent and repeated complaints of eyestrain symptoms among students rating 20/20 on the Snellen test and a cessation of these complaints following complete ophthalmic examination and correction. The United States Naval Academy reports that the incidence of disqualifications of senior cadets because of visual impairment became such a problem that it was found necessary to require each cadet at entrance to pass a strict ophthalmic examination including refraction. Recently the Dartmouth Eye Institute has published a monograph on Evaluation of Visual Factors in Reading.[4]

*Presented before the American Student Health Association, New York City, December 30, 1938.

This study covers a broad field and leads the authors to a large number of significant conclusions. Some of these are of particular interest to us at this stage of our committee work. First, the authors conclude that, "Only 64 per cent of the Class of 1940 (freshmen) are free from ocular defects, have only minor defects, or have received adequate ocular care. The remaining 36 per cent of the class have not received adequate ocular care," and second, "The usual examinations given by college health services do not give sufficient consideration to the ocular condition of the students." Another interesting conclusion states "Subjects having mild or moderate degrees of ocular defects are more likely to report symptoms than those having severe degrees of defect. That is, minimal ocular defects which may be missed by the usual Snellen test examination will give rise to serious interference with the student's ability to read effectively." All of the foregoing statements serve to impress us increasingly with the fact that many college students have ocular defects which need attention on the one hand, and on the other, the methods in general use in our health services today are inadequate to diagnose and remedy these defects.

Clearly the most effective method of dealing with our problem would be to institute universal ophthalmological examinations for students at entrance and thereafter as needed. When one considers the demands made upon students' eyes during the college course this method does

not seem extravagant, but when one comes down to earth and appraises the facilities available in our health services throughout the country one must conclude that at least for the present this elaborate examination is not universally possible and some compromise must be made. This compromise is the problem that faced the committee this year. We asked for suggestions from Association members to help us devise an effective, but simple method of testing vision and thanks to many of you shortly after last year's meeting we received a goodly number of suggestions. Our task was to devise a *simple* vision testing routine which could be used in any health service and could be universally recommended as being the best possible method of screening out those students who should be referred immediately for a complete ophthalmological examination on the one hand, and leaving behind, on the other, those who, we could assume, had no visual defects at all or only insignificant defects.

To devise a valid but simple test that could be universally recommended it was of course necessary to proceed only upon the best ophthalmologic advice in the country, and we called upon our Advisory Committee freely for their wisdom in formulating our recommendations. These recommendations have taken the form of the *Vision Appraisal Record Card* and *Accepted Standards for Vision Appraisal.* Copies of these have been sent to all Directors of student health in the Association with the hope that they will be used and criticized.

On October 6 the Eye Health Committee and the Advisory Committee held an all-day session in New York for the purpose of perfecting this *Record Card* and *Accepted Standards.* Each item was discussed separately and agreed upon by the committee and by our ophthalmologic consultants.

Your committee has also formulated a bulletin covering good study facilities for a college dormitory which is available to all health directors. The approved study lamp designed by Doctor Phelan was approved by your committee and the Advisory Committee. On this same day a joint meeting with a committee from the American Association of Teachers Colleges was held and matters relative to our common problem of vision conservation were discussed.

In our discussion of the proper use of the Snellen chart it became evident that many visual tests made by this method are quite invalid because of the improper use of the chart. Through Doctors Benedict, Hardy and Gradle, our Advisory Committee, specifications are being prepared, for approval by the Committee on Optics and Visual Physiology of the American Medical Association, for a standard holder and illuminator for the American Medical Association vision test chart. With a uniform technique being used throughout the test in a number of colleges we may expect to collect enough reliable data to furnish the basis of valuable studies.

We do not feel that the present recommendations, which we have sent to you, are the final word in vision testing, but they are the best simple methods available and should represent the springboard from which to take off in our effort to arrive at the ideal procedure. Specifically, we make the request that a number of institutions volunteer to use this recommended technique and preserve the records for a comprehensive study by the committee.

The committee wishes to express its gratitude to the members of the Advisory Committee (all of whom were present at our New York meeting in October) for their invaluable advice and generous help. Were it not for the generous help and stimulation of Mr. Carris and Dr. Phelan of the National Society for the Prevention of Blindness the work of this committee would have been entirely impossible.

L. H. FERGUSON, M.D.
L. M. HICKERNELL, M.D.
RUBY CUNNINGHAM, M.D.
R. W. BRADSHAW, M.D., *Chairman*

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Indigenous Malaria and Its Vectors in Minnesota

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THAT cases of malaria may originate in Minnesota is not only indicated by the widespread occurrence of anopheline mosquitoes capable of carrying the infection but has been proved by several instances in which the disease was acquired by individuals who had never been out of the state. One of these cases was brought to the attention of the writer by Dr. O. McDaniel, of the Minnesota Department of Health and, on investigation, was found to be a clear-cut instance of mosquito-borne infection. It was reported and the general problem discussed by Riley, (1930). Since that time, there have come to my attention a number of cases of malaria in Minnesota. Of these the great majority were clearly imported cases and some of those thought to be indigenous might be explainable on the basis of an extended period of incubation. The idea that clinical symptoms manifest themselves within ten days or two weeks after the bite of an infected mosquito has been shown to be inapplicable in many cases. Incubation periods of seven or eight months are common and Boyd and Kitchen, (1938) have reported a case of induced malaria in which symptoms were first manifest 304 days after the application of infected mosquitoes.

One of the two cases reported by Anderson, (1938) might have been acquired in northern Iowa since the man had been there on a fishing trip about a month before his infection was manifest. The second was the case of a man who lived 15 miles south of Rochester and had never been out of the state. The case reported by Weir (1937) seems equally clear-cut as the patient had never been out of the state farther than Alma, Wisconsin, just across the Mississippi from Kellogg, Minnesota.

Through the courtesy of Dr. McDaniel, I have a summary of nineteen cases of malaria reported to the State Department of Health for the years 1935-1937, inclusive. Of these nineteen cases, seven were clearly indigenous and two additional were presumably so, though the evidence is not so positive. One of these seven was acquired as the result of using for hypodermic injection a syringe belonging to another morphine addict. The few indigenous cases are not to be regarded as probable even though conceivable, sources of other human infection. It is much more probable that mosquito infections and hence potential human cases are due to the presence of malaria carriers among the million and a half tourists who come to the state each summer. The majority of these come in automobiles and many of them come from malarious districts of the South. The widespread use of induced malaria in the treatment of paresis undoubtedly adds to the chance of mosquito infections.

Concerning the moot question of the role of induced malaria in the spread of the infection, the experience of Swellengrebel and de Buck (1938), in the Netherlands is so extensive as to give weight to their conclusions that "unlike mosquito-borne malaria, inoculated malaria is invariably and definitely cured by a daily dose of 15 grains of sulfate of quinine continued for five days." Occasional reported relapses in patients treated with inoculated malaria they consider due to the mental state of the patients who, unless strictly supervised, cannot be relied upon to swallow the drugs they are expected to take.

There are present in Minnesota four different species of anopheline mosquitoes, each of which is known to be capable of transmitting malaria to man. These are *Anopheles maculipennis, A. quadrimaculatus, A. walkeri* and *A. punctipennis*. Of these, *A. maculipennis* and *A. quadrimaculatus* are generally regarded as the most efficient carriers of the infection. The collections of the Division of Entomology, of the University of Minnesota indicate that *A. maculipennis* is the dominant anopheline in the northern part of the state and that *A. punctipennis* is much the more common in the southern third, though it has been collected also in the Red River Valley and in Stearns and Pine counties. *Anopheles quadrimaculatus* seems to be relatively uncommon and there is little doubt that some of the earlier records of this species were due to misidentification of *A. walkeri*. An intensive study of the two species is being made by William Chalgren, a medical student. All four of the species occur in the region of the Twin Cities but in so far as our data indicate, *A. walkeri* is considerably more common.

It is significant that all of the clearly established cases of indigenous malaria in this state have occurred in the southern third, where *Anopheles punctipennis* is the most common species. I have personally collected the larvae in numbers at Rochester and from there south to the state line. Last August I found them in numbers in a tub in an auto camp near Winona. While this species is usually regarded as an indifferent carrier, King (1916) found that it was capable of maturing both the tertian and the aestivo-autumnal type of the parasite and Mitzmain (1916) transmitted the tertian type to three volunteers by allowing experimentally infected mosquitoes of this species to feed on them. A number of workers have since confirmed these results. Infected specimens have been found in nature.

It must be recognized that very little intensive collecting has been done in the southern part of the state or, for that matter, in any section except the immediate neighborhood of the Twin Cities and that suggestions as to the significance of *A. punctipennis* are purely tentative.

The recognition of *A. walkeri* as a distinct species is relatively recent and still more recent is the demonstration by Matheson, Boyd and Stratman-Thomas (1933)

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of the fact that it is capable of maturing and transmitting to man the organism of benign tertian malaria. There are no significant data to indicate whether it plays a role in the spread of malaria in nature but it readily attacks man and in collections of the past year in the neighborhood of the Twin Cities it constituted 78 per cent of the total catch of anophelines.

Since all available data indicate that *Anopheles maculipennis* and *A. quadrimaculatus,* the most efficient two vectors of malaria in the United States, are more commonly found in the northern part of the state the question naturally arises as to why indigenous malaria is confined largely to the southern third. The answer lies in the fact that Minnesota lies at about the northern limit of malaria the world over, a limit which is generally recognized as lying between the isothermal lines of 59°—61° F., mean summer temperature. In the United States the most malarious regions lie below the 80° F. isothermal line. Southern Illinois and Northern Missouri, where there is a moderate degree of benign tertian malaria have a mean summer temperature of 75°. In contrast to this, the records of the United States Weather Bureau show that in Minnesota the 65° isotherm is in the region of the Twin Cities, and extending north through the Red River valley to the northern boundary of the state. The mean summer temperature at Roseau is 62.9° F., at Duluth, 62.5° and at the eastern end of the Arrowhead it drops to 60°.

While there is abundant evidence that sporadic cases of malaria may originate in Minnesota, it is the imported case, in these days of widespread travel which is most likely to come to the attention of the Minnesota physician. Unfavorable climatic conditions, the short season with its relatively small population of anopheline mosquitoes, the few cases of human carriers which may infect the mosquitoes and the remote mathematical possibilities of just the right combination to insure transmission, all preclude the possibility of more than rare cases of indigenous origin. Such as do develop are much more likely to be in the southeastern part of the state.

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A New Approach to Psychotherapy in Chronic Alcoholism

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THE beginning and subsequent development of a new approach to the problem of permanent recovery for the chronic alcoholic has already produced remarkable results and promises much for the future. This statement is based upon four years of close observation. As this development is one which has sprung up among alcoholic patients themselves and has been largely conceived and promoted by them, it is felt that this new treatment can be reported freely and objectively.

The central idea is that of a fellowship of ex-alcoholic men and women banded together for mutual help. Each member feels duty bound to assist alcoholic newcomers to get upon their feet. These in turn work with still others, in an endless chain. Hence there is a large growth possibility. In one locality, for example, the fellowship had but three members in September 1935; eighteen months later the three had succeeded with seven more. These ten have since expanded to ninety.

It is much more than a sense of duty, however, which provides the requisite driving power and harmony so necessary for success. One powerful factor is that of self-preservation. These ex-alcoholics frequently find that unless they spend time in helping others to health, they cannot stay sober themselves. Strenuous, almost sacrificial work for other sufferers is often imperative in the early days of their recovery. This effort proceeds entirely on a good will basis. It is an avocation. There are no fees or dues of any kind, nor do these people organize in the ordinary sense of the word.

These ex-alcoholic men and women number about one hundred and fifty. One group is scattered along the Atlantic seaboard with New York as a center.

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Another, and somewhat larger body, is located in the Middle West. Many walks of life are represented, though business and professional types predominate. The unselfishness, the extremes to which these men and women go to help each other, the spirit of democracy, tolerance and sanity which prevails, are astonishing to those who know something of the alcoholic personality. But these observations do not adequately explain why so many gravely involved people are able to remain sober and face life again.

The principal answer is: Each ex-alcoholic has had, and is able to maintain, a vital spiritual or "religious" experience. This so-called "experience" is accompanied by marked changes in personality. There is always, in a successful case, a radical change in outlook, attitude and habits of thought, which sometimes occurs with amazing rapidity, and in nearly all cases these changes are evident within a few months, often less.

That the chronic alcoholic has sometimes recovered by religious means is a fact centuries old. But these recoveries have been sporadic, insufficient in numbers or impressiveness to make headway with the alcoholic problem as a whole.

The conscious search of these ex-alcoholics for the right answer has enabled them to find an approach which has been effectual in something like half of all the cases upon which it has been tried. This is a truly remarkable record when it is remembered that most of them were undoubtedly beyond the reach of other remedial measures.

The essential features of this new approach, without psychological embellishment, are:

1. The ex-alcoholics capitalize upon a fact which they have so well demonstrated, namely: that one alcoholic can secure the confidence of another in a way and to a degree almost impossible of attainment by a non-alcoholic outsider.

2. After having fully identified themselves with their "prospect" by a recital of symptoms, behavior, anecdotes, etc., these men allow the patient to draw the inference that if he is seriously alcoholic, there may be no hope for him save a spiritual experience. They cite their own cases and quote medical opinion to prove their point. If the patient insists he is not alcoholic to that degree, they recommend he try to stay sober in his own way. Usually, however, the patient agrees at once. If he does not, a few more painful relapses often convince him.

3. Once the patient agrees that he is powerless, he finds himself in a serious dilemma. He sees clearly that he must have a spiritual experience or be destroyed by alcohol.

4. This dilemma brings about a crisis in the patient's life. He finds himself in a situation which, he believes, cannot be untangled by human means. He has been placed in this position by another alcoholic who has recovered through a spiritual experience. This peculiar ability, which an alcoholic who has recovered exercises upon one who has not recovered, is the main secret of the unprecedented success which these men and women are having. They can penetrate and carry conviction where the physician or the clergyman cannot. Under these conditions, the patient turns to religion with an entire willingness and readily accepts, without reservation, a simple religious proposal. He is then able to acquire much more than a set of religious beliefs; he undergoes the profound mental and emotional change common to religious "experience". (See William James' *Varieties of Religious Experience*). Then, too, the patient's hope is renewed and his imagination is fired by the idea of membership in a group of ex-alcoholics where he will be enabled to save the lives and homes of those who have suffered as he has suffered.

5. The fellowship is entirely indifferent concerning the individual manner of spiritual approach so long as the patient is willing to turn his life and his problems over to the care and direction of his Creator. The patient may picture the Deity in any way he likes. No effort whatever is made to convert him to some particular faith or creed. Many creeds are represented among the group and the greatest harmony prevails. It is emphasized that the fellowship is non-sectarian and that the patient is entirely free to follow his own inclination. Not a trace of aggressive evangelism is exhibited.

6. If the patient indicates a willingness to go on, a suggestion is made that he do certain things which are obviously good psychology, good morals and good religion, regardless of creed:

a. That he make a moral appraisal of himself, and confidentially discuss his findings with a competent person whom he trusts.

b. That he try to adjust bad personal relationships, setting right, so far as possible, such wrongs as he may have done in the past.

c. That he recommit himself daily, or hourly if need be, to God's care and direction, asking for strength.

d. That, if possible, he attend weekly meetings of the fellowship and actively lend a hand with alcoholic newcomers.

This is the procedure in brief. The manner of presentation may vary considerably, depending upon the individual approached, but the essential ingredients of the process are always much the same. When presented by an ex-alcoholic, the power of this approach is remarkable. For a full appreciation one must have seen the work and must have known these patients before and after their change.

Considering the presence of the religious factor, one might expect to find unhealthy emotionalism and prejudice. This is not the case however; on the contrary, there is an instant readiness to discard old methods for new ones which produce better results. For instance, it was early found that usually the weakest approach to an alcoholic is directly through his family or friends, especially if the patient is drinking heavily at the time. The ex-alcoholics frequently insist, therefore, that a physician first take the patient in hand, placing him in a hospital whenever possible. If proper hospitalization and medical care is not carried out, this patient faces the danger of delirium tremens, "wet brain" or other complications. After a few days' stay, during which

time the patient has been thoroughly detoxicated, the physician brings up the question of permanent sobriety and, if the patient is interested, tactfully introduces a member of the ex-alcoholic group. By this time the prospect has self-control, can think straight, and the approach to him can be made casually, with no intervention by family or friends. More than half of this fellowship have been so treated. The group is unanimous in its belief that hospitalization is desirable, even imperative, in most cases.

What has happened to these men and women? For years, physicians have pursued methods which bear some similarity to these outlined above. An effort is made to procure a frank discussion with the patient, leading to self-understanding. It is indicated that he must make the necessary re-adjustment to his environment. His coöperation and confidence must be secured. The objectives are to bring about extraversion and to provide someone to whom the alcoholic can transfer his dilemma.

In a large number of cases, this alcoholic group is now attaining these very objectives because their simple but powerful devices appear to cut deeper than do other methods of treatment because of the following reasons:

1. Because of their alcoholic experiences and successful recoveries they secure a high degree of confidence from their prospects.

2. Because of this initial confidence, identical experience, and the fact that the discussion is pitched on moral and religious grounds, the patient tells his story and makes his self-appraisal with extreme thoroughness and honesty. He stops living alone and finds himself within reach of a fellowship with whom he can discuss his problems as they arise.

3. Because of the ex-alcoholic brotherhood, the patient, too, is able to save other alcoholics from destruction. At one and the same time, the patient acquires an ideal, a hobby, a strenuous avocation, and a social life which he enjoys among other ex-alcoholics and their families. These factors make powerfully for his extraversion.

4. Because of objects aplenty in whom to vest his confidence, the patient can turn to the individuals to whom he first gave his confidence, the ex-alcoholic group as a whole, or the Deity. It is paramount to note that the religious factor is all important even from the beginning. Newcomers have been unable to stay sober when they have tried the program minus the Deity.

The mental attitude of these people toward alcohol is interesting. Most of them report that they are seldom tempted to drink. If tempted, their defense against the first drink is emphatic and adequate. To quote from one of their number, once a serious case at this hospital, but who has had no relapse since his "experience" four and one-half years ago: "Soon after I had my experience, I realized I had the answer to my problem. For about three years prior to December 1934 I had been taking two and sometimes three bottles of gin a day. Even in my brief periods of sobriety, my mind was much on liquor, especially if my thoughts turned toward home, where I had bottles hidden on every floor of the house. Soon after leaving the hospital, I commenced to work with other alcoholics. With reference to them, I thought much about alcohol, even to the point of carrying a bottle in my pocket to help them through severe hangovers. But from the first moment of my experience, the thought of taking a drink myself hardly ever occurred. I had the feeling of being in a position of neutrality. I was not fighting to stay on the water wagon. The problem was removed; it simply ceased to exist for me. This new state of mind came about in my case at once and automatically. About six weeks after leaving the hospital my wife asked me to fetch a small utensil which stood on a shelf in our kitchen. As I fumbled for it, my hand grasped a bottle, still partly full. With a start of surprise and gratitude, it flashed upon me that not once during the past weeks had the thought of liquor being in my home occurred to me. Considering the extent to which alcohol had dominated my thinking, I call this no less than a miracle. During the past four years of sobriety I have seriously considered drinking only a few times. On each occasion, my reaction was one of fear, followed by the reassurance which came with my new found ability to think the matter through, to work with another alcoholic, or to enter upon a brief period of prayer and meditation. I now have a defense against alcoholism which is positive so long as I keep myself spiritually fit and active, which I am only too glad to do."

Another interesting example of reaction to temptation comes from a former patient, now sober three and one-half years. Like most of these people, he was beyond the reach of psychiatric methods. He relates the following incident:

"Though sober now for several years, I am still bothered by periods of deep depression and resentment. I live on a farm, and weeks sometimes pass in which I have no contact with the ex-alcoholic group. During one of my spells I became violently angry over a trifling domestic matter. I deliberately decided to get drunk, going so far as to stock my guest house with food, thinking to lock myself in when I had returned from town with a case of liquor. I got in my car and started down the drive, still furious. As I reached the gate I stopped the car, suddenly feeling unable to carry out my plan. I said to myself, 'At least I have to be honest with my wife.' I returned to the house and announced I was on my way to town to get drunk. She looked at me calmly, never saying a word. The absurdity of the whole thing burst upon me and I laughed. And so the matter passed. Yes, I now have a defense that works. Prior to my spiritual experience I would never have reacted that way."

The testimony of the membership as a whole sums up to this: For the most part, these men and women are now indifferent to alcohol, but when the thought of taking a drink does come, they react sanely and vigorously.

This alcoholic fellowship hopes to extend its work to all parts of the country and to make its methods and answers known to every alcoholic who wishes to recover. As a first step, they have prepared a book called *Alcoholics Anonymous**. A large volume of 400 pages, it sets forth their methods and experience exhaustively, and

with much clarity and force. The first half of the book is a text aimed to show an alcoholic the attitude he ought to take and precisely the steps he may follow to effect his own recovery. He then finds full directions for approaching and working with other alcoholics. Two chapters are devoted to family relations and one to employers for the guidance of those who surround the sick man. There is a powerful chapter addressed to the agnostic, as the majority of the present members were of that description. Of particular interest to the physician is the chapter on alcoholism dealing mostly with its mental phenomena, as these men see it.

By contacting personally those who are getting results from the book, these ex-alcoholics expect to establish new centers. Experience has shown that as soon as any community contains three or four active members, growth is inevitable, for the good reason that each member feels he must work with other alcoholics or perhaps perish himself.

Will the movement spread? Will all of these recoveries be permanent? No one can say. Yet, we at this hospital, from our observation of many cases, are willing to record our present opinion as a strong "Yes" to both questions.

*Editor's Note The book, Alcoholics Anonymous ($3 50) may be secured from The Alcoholic Foundation, Post Box 658, Church Street Annex, New York City

Book Reviews

Clinical Pathological Gynecology, by J THORNWELL WITHERSPOON, M A (Oxon), M D (Johns Hopkins); formerly associate professor of experimental and pathological gynecology, Indiana University Medical Center, Indianapolis, octavo, 400 pages, illustrated with 271 engravings, Philadelphia Lea & Febiger, 1939 Cloth, $6 50, net

This book is an effective introduction to clinical pathological gynecology based on the author's unusually successful teaching experience In it the more common clinical diseases are studied in detail This study is followed by clinical interpretations of the etiology, symptoms, signs, treatment and prognosis of each condition, presenting the pathological and clinical pictures of each disease This combination of pathological and clinical relationship unifies the various gynecological disease entities The text gives a thorough understanding of gynecological pathology and a comprehensive review of the clinical aspects of each pathological condition It avoids the theoretical and to that end the discussion of embryology, congenital anomalies and the anatomy of the female pelvic organs, except for a few illustrations, is purposely omitted

The text is an expression of organic gynecological pathology and its clinical applications The material is arranged in anatomical locations rather than under similarity of diseases, thus, all pathological conditions related to the vulva are discussed under vulval lesions and those of the ovary under ovarian diseases Infections and tumors pertaining to these locations are developed in the order named The 271 engravings provide visual as well as verbal teaching A clinical or gross specimen photograph and both magnified and microscopic photographs are provided for each disease that is studied The pathological descriptions of the various conditions are described in the text Most of the illustrations are original No attempt has been made to present extensive bibliographies but the more important references are noted immediately after each gynecological disease This work is an effective summary of the diagnosis and treatment of gynecological disorders It is splendidly organized and is an effective and conservative guide in this field

Practice of Medicine, by JONATHAN CAMPBELL MEAKINS, M D, LL D, second edition, 1413 pages, 521 illustrations, St Louis C V Mosby Co, 1938 Price $12 50

The second edition of MEAKINS' excellent general textbook in the field of medicine contains many revisions, making this a most valuable general reference book As Dr MEAKINS says in the preface to this new edition "Among the conditions which have been amplified or added are the following acute laryngeal tracheo bronchitis, tuberculous tracheitis, cyst of the lungs, Friedlander pneumonia, lipoid pneumonia, monocytic leukemia, nutritional edema, protamine zinc insulin, experimental nephritis, vascular renal failure, congenital aplasia of the kidneys, uremic state, sulfanilamide therapy, lymphogranulomatosis inguinalis, epidemic pleurodynia, and cannabis indica intoxication" I quote this excerpt from the preface as some indication of the wide revision and modernization of the text which has taken place

Many extremely valuable illustrations have been included in this edition

One might wish the section on "Infectious Diseases" had been amplified somewhat Likewise, the subject of allergy is treated in a very cursory manner On the whole, this revised edition of *The Practice of Medicine* brings to the practitioner or medical student the latest scientific information in practically every field of medicine in a manner that is both easy to read and to understand

Symptoms of Visceral Disease, by FRANCIS MARION POTTENGER, A M, M D, LL D, F A C P; St Louis· The C V Mosby Company, 1938 Price $5 00

This fifth edition since 1919 is a good indication of the popularity of Dr Pottenger's book He has spent a great deal of time on the subject of visceral disease and has made some valuable contributions to our knowledge of this subject

The first chapter of the book is devoted to the evolution of modern medicine Part I, containing chapters 2 to 7 inclusive, is a presentation of the vegetative nervous system

Part II consists of chapters 8 to 15 inclusive, which deal with the relationship between the vegetative nervous system and the symptoms of visceral disease

Part III is composed of twenty chapters dealing with the innervation of important viscera and including a clinical study of the more important viscerogenic reflexes

The book contains eighty seven excellent illustrations It has a good index and contains much information of great value

Pulmonary Tuberculosis in Adults and Children, by JAMES ALEXANDER MILLER, A M, M D, D P H, Sc D, professor of clinical medicine, College of Physicians and Surgeons, Columbia University, and ARVID WALLGREN, head of the Children's Hospital, Gothenburg, Sweden, New York· Thomas Nelson & Sons, 1939. $3 50

Miller of New York and Wallgren of Gothenburg, Sweden, are physicians whose names have frequently appeared in the literature Both have had wide experience in the field of tuberculosis This volume consists for the most part of the chapters by Miller and Wallgren which are published in the Nelson Loose Leaf *Medicine*

The book includes discussions of tuberculosis in all of its phases from the time tubercle bacilli enter the body until the disease takes the life of the individual This work of 193 pages contains an excellent list of references and a fine index Every physician in this nation would profit greatly by reading it.

The
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VETERANS HOSPITAL

In the report of the Committee on Legislative Activities, presented at the recent session of the American Medical Association, it was pointed out that there were on June 30, 1938, in the Veterans Administration facilities, 51,991 hospital beds apportioned to different classes of patients.

During the fiscal year of 1939 it was proposed to add 3,453 new beds, and during the fiscal year of 1940 it was proposed to add 6,731 new beds, making a total, if the plans are carried out, of 62,175 beds in the Veterans Hospitals as of June 30, 1940.

The present hospital building program of the Administration is being carried out through the appropriation of $4,575,000 made available directly by the Seventy-fifth Congress. But this is being supplemented by a sum three times as large, $13,268,200, donated by the Public Works Administration. The Administrator of Veteran Affairs contemplates an ultimate goal of 100,000 beds in Veterans Hospitals, or one bed for every 40 veterans throughout the United States. He estimates that the peak load will be reached by 1949 or 1950. What will become of these hospital facilities as the load declines is not clear.

In addition to the foregoing, House Bills authorizing a 500 bed hospital for Florida and a million dollar hospital for Eastern South Dakota have been introduced.

The recent report of the Council on Medical Education and Hospitals of the American Medical Association shows that in the United States there are 4,438 non-governmental hospitals with a bed capacity of 346,244, showing an average census of 229,019. This would seem to indicate that in the existing non-governmental hospitals there are available 115,000 beds. It would, therefore, seem that it would be much more to the point for the Veterans Administration to introduce legislation making it possible for them to use private facilities in the care of the veterans rather than add to our already staggering tax-burden for the building of more governmental hospitals which would in turn tend to make more empty beds in our private hospitals.

C. E. S.

HAIL TO OUR YOUTH

It was Victor Hugo, was it not, who said that every man was a radical at 25 and a conservative at 50? Whoever it was and whatever the exact ages were, the statement is expressive of a universal truth. Osler in his much misquoted statement about chloroforming at 60 gave voice to a kindred thought when he said that only comparatively young persons were capable of true inventions, that is, inventions requiring original thought.

The conservative deplores the rashness of youth and expresses fear that the consequence of youth's acts may upset the apple cart. Nevertheless, this good old world owes much of its progress to the trial-and-error method of youthful experimentation. The conservative keeps the radical within bounds, but we must admit that the radical gives us something to think about. True, stability is necessary, but it need not be absolute There can be no advancement without some change.

We are not in sympathy with lamentations about our youth going to hell. That is not conservatism, that is pessimism; and pessimism is destructive By giving voice to such expressions, we classify ourselves as old Youth, we know, is not prejudiced by custom and usage. Youth thinks along new lines Only youth will steer the bark out on uncharted seas Let us stay young as long as we can.

A E. H.

SOUTH DAKOTA NEW LAWS

On July 1, 1939, the new premarital and pregnant woman laws will become effective These laws passed by the 1939 Legislature require that each applicant for a marriage license in South Dakota present a certificate from a licensed physician of the state showing that the applicant has had a standard laboratory test for the detection of syphilis and that in the opinion of the physician the applicant is not infected with the disease, or if so infected, is not in a stage of the disease which is or may later become communicable. Presentation of such a certificate to the Clerk of Courts before a license to marry is required unless the woman is now pregnant and infected with syphilis If such is the case she must present a certificate from a physician stating that she is pregnant.

The pregnant woman law is as follows: "27 2406 Pregnant women: blood test to be made. (1) Each physician attending a pregnant woman in this state during gestation shall, in the case of each woman so attended, take or cause to be taken a sample of blood of such woman at the time of the first examination, and submit such sample for standard serological tests for syphilis to the state health laboratory of the state board of health or such other laboratories cooperating with and approved by the state board of health Every other person permitted by law to attend upon pregnant women in the state but not permitted by law to take blood tests, shall cause a sample of the blood of such pregnant woman to be taken by a duly licensed physician and submitted for standard serological tests for syphilis to the state hygienic laboratory of the state board of health or such other laboratories cooperating with and approved by the state board of health. Such tests as may be made by the state health laboratory of the state board of health shall be free of charge. The result of all laboratory tests shall be reported on standard forms prescribed and furnished by the state board of health. (2) In reporting every birth and stillbirth, physicians and others permitted to attend pregnancy cases and required to report births and stillbirths shall state on the birth certificate or stillbirth certificate, as the case may be, whether a blood test for syphilis has been made during such pregnancy upon a specimen of blood taken from the woman who bore the child for which a birth or stillbirth certificate is filed, and if made, the date when such test was made, and if not made, the reason why such test was not made. In no event shall the birth certificate state the result of the test."

Each County Clerk of Courts will be furnished the necessary forms and instructions. No license to marry can be issued without the physician's certificate for both parties. The procedure to procure a physician's certificate to marry is very simple. Both applicants for license to marry must call on their family physician, not more than twenty days prior to the issuance of the license. The physician takes a sample of blood which he sends to any one of the laboratories designated by the State Board of Health to make the blood or serological test. When the tests are completed the laboratory makes a confidential report to the physician for his private files. If, in the opinion of the physician the applicant is free from this disease, he may issue a certificate of health which the applicant presents to the Clerk of Courts and signs in the presence of the Clerk.

Copies of these laws may be secured from the State Board of Health, Pierre, South Dakota.

J. F. D. C.

CHARLES HORACE MAYO

Dr. Charlie is asleep There are no words to assuage the grief, personal and universal His Family and his Church will this day tenderly commit the mortality of his body to the good earth and the immortality of his great spirit to the memory of his friends and comrades throughout the world.

There was ever no man worthier in life and none was greater in death. He crashed the mortal gates rich in honors and achievement after half a century of matchless service to humanity. None has carried his high office with greater professional integrity and efficiency in this amazing generation; none has adorned it with finer human excellence. He was a "friend of man."

He will live forever in the hearts of the countless sick bodies he has mended and in the broken spirits he gave new hope. Together with his illustrious brother, Dr. Will, he has left an enduring impress upon the medical profession. He is Minnesota's greatest contribution to America. Ten years ago in an international survey he was nominated among the seven greatest personalities in the world. With our Lincoln, he belongs to the Ages.

Dr. Charlie is not dead; his great spirit marches on.

O. J. H.

Charles Horace Mayo

Dr. Charles Horace Mayo was born on July 19, 1865, at Rochester, Minnesota, and was the younger son of Dr. William Worrell Mayo, who came from Eccles in Lancashire, England, studied chemistry at Owens College and medicine at the University of Missouri, and finally established himself in medical practice in Rochester in 1863.

Dr. Charles Mayo was graduated from the Rochester High School, attended Nile's Academy, and in the autumn of 1885 entered the Chicago Medical College, which was affiliated with Northwestern University. In 1888 he was awarded the degree of Doctor of Medicine by that institution, and the following year he did postgraduate work at the New York Polyclinic Medical School. In 1890 he attended the New York Post-Graduate Medical School.

"It is characteristic," wrote Professor J. R. Learmonth,[1] Regius professor of surgery in the University of Aberdeen (Scotland) from 1932, until he succeeded the late Sir David Wilkie at Edinburgh, "that his first six contributions to medical journals dealt with such varied subjects as glandular tuberculosis, cerebral surgery, nasal sinusitis, injuries of nerves, skin-grafting, and obstruction of the common bile-duct. In all he wrote or shared in 413 papers of professional interest; although in his later life he narrowed the field of his technical interest, he maintained the same broad outlook on surgery in general, and his contributions were always characterized by clarity and proper perspective."

For many years Dr. Mayo did much of the orthopedic surgery performed at Rochester; he also did many operations for cataract and in the field of otorhinology and plastic surgery. His name has been given to an operation for varicose veins, a type of vaginal hysterectomy, and to a procedure for the relief of bunions. One of his outstanding surgical achievements was his adaptation of Coffey's technic for transplantation of the ureters for exstrophy of the bladder. He was a pioneer in evolving various technics for the surgical treatment of the thyroid gland.

Keenly interested in education, Dr. Mayo was a trustee of both Northwestern University and Carleton College, and was the founder, with his brother, William J. Mayo, of the Mayo Foundation for Medical Education and Research, now an integral part of the University of Minnesota. Dr. Mayo held the rank of professor of surgery in the Foundation.

The lifelong association of Charles and William Mayo was expressed in 1931 by William J. Mayo, on the occasion of the elder brother's seventieth birthday anniversary. Speaking of his younger brother, Dr. William J. Mayo[2] told members of the American Surgical Association: "Something more than four years younger, Charlie has stimulated me by precept and example, and our association has been unique not only in the love and confidence we have for each other, but in having made an opportunity for two men to work as one and to share equally such rewards as have come. Even to this day, not only have our fraternal contacts been maintained, but also our habit of having a common pocketbook, in which each has wanted the other to have the greater share. And with due regard to the statement of a truth, my brother, Charles H. Mayo, is not only the best clinical surgeon from the standpoint of the patient that I have ever known, but he has that essential attribute of the true gentleman, consideration for others."

A former surgical assistant of Dr. Mayo's, Mr. A. H. McIndoe,[3] now resident in England, wrote: "Few there were who after five minutes' conversation did not fall beneath the spell of those twinkling eyes set in a half-serious, half-humorous face, of the quiet voice with its characteristic dry twang and the head cocked a little on one side. His method of expression was unforgettable. He presented facts and figures in forthright manner with apt illusions and illustrations drawn from natural history and comparative anatomy, sometimes germane to the point under discussion, sometimes not. He illuminated his picture with flashes of dry humor which kept his audience in a bubble of anticipation."

Foreign governments and universities throughout the world bestowed honors on Dr. Mayo. He was president of the Western Surgical Association (1904-1905); Minnesota State Medical Association (1905-1906); the Section on Surgery of the International Congress on Tuberculosis (1908-1909); the Society of Clinical Surgery (1911-1912); the Clinical Congress of Surgeons of North America (1914-1915); the American Medical Association (1916-1917); the American College of Surgeons (1924-1925); the American Surgical Association (1931-1932); the Section on General Surgery of the Panamerican Medical Association (1932-1934); the Minnesota Public Health Association (1932-1936; honorary president for life after 1936); and of the Interstate Postgraduate Medical Association of North America (1933-1934).

Dr. Mayo died of pneumonia at Mercy Hospital, Chicago, on May 26, 1939. He lay in state in the main lobby of the Mayo Clinic on Sunday, May 28; and funeral services were conducted at Calvary Episcopal Church in Rochester on Monday, May 29, 1939.

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Charles Horace Mayo
1865-1939

Societies

SCIENTIFIC PROGRAM OF THE MINNEAPOLIS CLINICAL CLUB

Nineteenth Anniversary Meeting, January 12, 1939
H. M. N. Wynne, M.D., Presiding

SOME RECENT ADVANCES IN GENERAL SURGERY

WILLARD D. WHITE, M.D.
MINNEAPOLIS, MINNESOTA

My part in the program this evening is to mention and discuss briefly some of the recent advances in general surgery. In the brief time allotted we could mention as many as possible of the subjects in this classification. If we merely mentioned these without any discussion, we would be much like the man and his wife who were making a tour of Europe visiting as many points of interest as possible such as historical sites, cathedrals, art galleries, etc. As they hurried through one of the art galleries, the man stopped before a painting he had heard about and which he wished to really examine carefully. As he did so his wife grabbed him by the arm and said, "Come on, dear, don't stop to look at anything or we will not see everything."

Therefore it might be profitable to stop at least a moment or two at one or two points as we enumerate the different subjects.

STORING OF BLOOD FOR EMERGENCY PROCEDURES

Stored blood of cadavers has been used for transfusions in Europe and especially in Russia and has been used even when it has been stored for as long as three weeks at a temperature of 17 to 20 degrees C. There are differences in the behavior of blood from cadavers and that of fresh blood taken from living persons in respect to coagulation. Blood from living persons will clot unless it is mixed with an anticoagulant, whereas blood taken from the bodies of individuals who have died suddenly, from gunshot wounds, acute trauma, apoplexy, coronary disease or electric shock will form a coagulum at first but after 15 minutes to an hour the coagulum dissolves and the blood becomes liquid once more. This phenomenon of fibrinolysis can be accelerated by heating or shaking. The mechanism is not entirely understood, since blood collected from individuals who have expired from such wasting diseases as tuberculosis, carcinoma, etc., does not exhibit this phenomenon and when this blood coagulates, it does not again become liquid.

The blood is obtained from the jugular vein soon after death. No anticoagulant is added to the blood which remains fluid after withdrawal. A complete postmortem examination is made. The blood is tested for syphilis. It is grouped and stored until ready to be used. So far as I know this has not been used, at least to any extent, in the United States.

A so-called blood bank is however quite generally used, particularly in the larger hospitals. Here the blood is obtained from living persons. It is grouped, tested and stored in the ice box until its use is demanded. It is then available for use on very short notice. It merely requires cross matching with the individual patient and warming it up to about body temperature. When one bottle is taken out from the "blood bank" another is replaced by the same service that uses it, thereby maintaining a constant supply. A blood bank is especially useful in large hospitals where there is much emergency work and ordinarily blood from the bank is taken out and new blood put in. However, if it is preferred, the blood can be taken, of course, from a donor directly as has been done usually heretofore.

THE NATURE OF BLEEDING IN JAUNDICE

This subject has been studied and discussed a great deal recently. An excellent discussion was published by A. J. Quick of Milwaukee in the *Journal of the American Medical Association*, May 14, 1938, volume 110, page 1658. The following is for the most part taken from that article.

It has been realized that the occurrence of bleeding in jaundice patients cannot be predicted with any degree of certainty either clinically or by means of the common laboratory methods which have been in general use up until recently. The phenomenon of clotting might be expressed somewhat as follows:

(1) Prothrombin + thromboplastin + calcium = thrombin.

(2) Fibrinogen + thrombin = fibrin, which is the clot.

Therefore, a deficiency of any one of these factors required for the formation of thrombin or the absence of marked depletion of fibrinogen will cause a retardation or even a complete inhibition of clotting. Without going into the details of the investigation it suffices to say that the evidence now has indicated that the fault lies in a deficiency of the prothrombin. Until recently no satisfactory method for determining prothrombin and thromboplastin were available. A method was devised which is dependent on the observation at the clotting time of oxalated plasmas, when mixed with an excess of thromboplastin and an optimum amount of calcium can be employed as a direct measure of the prothrombin content of the plasma. In other words, by keeping thromboplastin and calcium constant the rate of coagulation is dependent on the concentration of prothrombin and can therefore serve as a simple and direct means for determining this important clotting factor in blood.

The prothrombin concentration of human blood was found to be remarkably constant in normal persons. Significantly, the prothrombin was found quantitatively the same in hemophilic blood as in healthy subjects. While a normal prothrombin was also found in the majority of jaundiced patients a certain number showed a definite and in a few instances a drastic reduction of this clotting agent. Evidence has now been obtained which clearly shows that a close relationship exists between prothrombin deficiency and the severity of the bleeding tendency in jaundice. It was found that by avitaminosis (vitamin K deficiency) that a hemorrhagic disease could be produced in chicks. This was done by means of a diet deficient in a new food accessory which has been named vitamin K or koagulation vitamin. A diet which was complete except for an adequate amount of vitamin K was given to chicks and a diminution in prothrombin resulted quite promptly and a definite hemorrhagic tendency was invariably observed. Small amounts of alfalfa, a food particularly rich in the new vitamin, promptly restored the prothrombin to the normal level and cured the hemorrhagic condition.

In sections of the country in which sweet clover is used as fodder, it is well known that if this hay is spoiled during curing it is apt to cause a hemorrhagic disease. Heavy losses due to hemorrhage following simple procedures, such as dehorning cattle and castrating bull calves have occurred in this country and in Canada. It was observed that the hemorrhagic tendency ran parallel to the decrease in prothrombin. It is of clinical interest that a transfusion with citrated blood promptly elevated the prothrombin of the blood and produced a temporary improvement in the hemorrhagic condition. After twenty-four hours, however, the prothrombin had sunk again to the previous low level. The disease is easily treated, since merely stopping the feeding of the spoiled hay and substituting alfalfa meal promptly cures the hemorrhagic condition. This suggests that the toxin of sweet clover hay exerts its depressing action on prothrombin directly rather than by causing severe organic injury to any organ such as the liver and thereby impairing its power to synthesize prothrombin.

INJURY TO THE LIVER

The tendency to hemorrhage following severe parenchymal damage to the liver has long been recognized. This bleeding also appears to be dependent upon a reduction of prothrombin. An experimental animal can be subjected to chloroform anesthesia for a long enough time to produce liver damage and there will be found a prothrombin deficiency. Carbon tetrachloride when given orally can also produce a prothrombin deficiency. Irrespective of the cause for the drop of prothrombin, no serious bleeding was observed until the prothrombin of the blood was reduced to a markedly low level, that is, below 10 per cent of the normal in human and even lower in rabbit blood.

There is obviously a wide margin of safety in the prothrombin factor and significantly the coagulation time as measured by the usual method may remain normal until more than 80 per cent of prothrombin of the blood is lost. The coagulation time is very little prolonged until the prothrombin drops to 20 per cent, and only below this level does the time of clotting rapidly increase with further reduction of prothrombin. It is frequently observed that a jaundiced patient just before operation shows no tendency to hemorrhage either clinically or by laboratory tests but nevertheless has serious bleeding soon after operation. Perhaps in many of these cases a decreasd prothrombin concentration exists which is not sufficient to bring the patient into the hemorrhagic zone but enough to exhaust the margin of safety. The converse condition is also fortunately true. The patient with concentration of prothrombin so low that clotting is very defective is strikingly benefitted by even a small transfusion. By restoring only a fraction of the prothrombin, the concentration is often sufficiently raised to bring the prothrombin to a level at which normal clotting occurs. In sweet clover disease it was found that a transfusion was of but temporary benefit for if the feeding of toxic hay was continued the prothrombin rapidly decreased again. Similarly in the bleeding of the jaundiced patient, transfusions usually are of only temporary effectiveness.

Clinical observations may be confusing. Icterus itself cannot be the cause of bleeding while only a small percentage of jaundiced patients bleed or will show any hemorrhagic tendency. It is well known that a deeply jaundiced patient shows no abnormal hemorrhagic tendency and has no postoperative bleeding. On the other hand patients with a biliary fistula having no evidence of jaundice may have severe hemorrhage. Rather than blaming jaundice as the cause of bleeding, it seems much more logical to recognize the possibility that often the two may be resultant of but one and the same agent. Thus carbon tetrachloride will cause both an intrahepatic type of jaundice and a fall of prothrombin.

The discovery that a food accessory, that is, a fat soluble vitamin, is required by the organism for the synthesis of prothrombin is of special importance. Hemorrhage has been observed in patients with biliary fistula as well as in animals in which the fistula was experimentally produced. There is evidence to show that the depletion of prothrombin may be due to the absence of bile acids in the intestinal tract, thus causing a faulty absorption of vitamin K. Bile probably acts as a carrying agent for the vitamin across the intestinal tract.

MANAGEMENT OF THE JAUNDICED PATIENT

Irrespective of the causes of jaundice, several helpful suggestions can be made for the treatment of the jaundiced patient particularly with regard to the prevention of hemorrhage. The hippuric acid test may furnish valuable information as to the liver function. If it is reduced much below 50 per cent of the normal the patient is apt to be a poor surgical risk. The use of dextrose is well recognized and the administration of gelatin has been recommended because of its high content of aminoacetic acid. The direct determination of prothrombin offers an advantage and helps in forming a prognosis and in making a guide in combating hemorrhage. If a prothrombin deficiency is found, effort should be made to restore the level of this clotting factor to a course that assures normal clotting. Administration of vitamin K either in the form of powdered alfalfa leaf or an extract is indicated. One should also administer bile, bile acids or desoxycholic acid, to assist in the absorption not only of vitamin K but of vitamins A and D as well. If injury to the liver is present, dextrose, gelatin or aminoacetic acid, calcium and viosterol are the chief therapeutic agents available. If the prothrombin concentration of the blood is below 15 per cent the only prompt and effective treatment is transfusion. It must be emphasized, however, that the benefit from the transfusion is only temporary. In patients with an external biliary fistula, the bile may be collected and given to the patient by having him swallow it or by introducing it through a stomach tube. Vitamin K is prepared from alfalfa but apparently it is more practical commercially to prepare it from a fish meal which is allowed to putrify and the vitamin K is found in the oily residue after it is extracted with ether.

INTUBATION STUDIES OF THE SMALL INTESTINE

Abbott and Johnston reported in *Surgery, Gynecology and Obstetrics*, volume 56, April 1938, page 691, about their studies in intubation of the small intestine. The local treatment of intestinal obstruction consists of (1) reducing the dispension of the gut proximal to the lesion, (2) locating and relieving the obstruction and (3) excising any gangrenous tissue devitalized by disturbance of its blood supply. A double lumen tube is introduced through the patient's nose. Attached to one lumen of this tube is a collapsed balloon and to the other lumen is a duodenal bucket. The patient is taken to the fluoroscopy room. He lies on his right side. When it can be seen that the end of the tube has entered the duodenum, a volume of about 30 cc. of air is injected into the balloon while transient suction is maintained on the larger tube. As the gas and fluid are sucked out of the gut, the intestinal wall contracts and regaining their normal propulsive movement, they force the balloon ahead. The suction likewise collapses the intestine, loop by loop as the tip of the tube advances until the obstruction is reached, by which time release of the distension and relief of pain is obtained.

In cases in which organic obstruction is suspected, diagnostic measures may now be undertaken. The injection of a small amount of barium sulphate in dilute suspension will frequently indicate that the point of constriction on the pattern of the intestinal mucosa. The aspirated contents may be examined. When the situation warrants, the balloon can be deflated and withdrawn by gentle traction.

In a normal individual the apparatus will advance along the intestine at the rate of about 1 centimeter per minute or 2 feet an hour. A length of 6 or 8 feet of tubing is generally enough to reach from the pylorus to the cecum, 8 to 10 feet beyond the teeth. In obstructed cases the tube advances about a foot an hour. It is important that the tube be marked at 6 inch intervals so that the patient and the nurse may be given a schedule to insure correct speed of swallowing; a coil in the stomach from too rapid passage will sometimes check its advance.

SURGERY OF THE COLON

Sir Hugh Devine from Melbourne, Australia, published in *Surgery*, February, 1938, page 165, an excellent article on what he called "Operation on a Defunctioned Distal Colon." The main point of the article is that with proper preparation of the patient who requires surgery of the colon, the mortality and morbidity can be very greatly reduced. This preparation consists essentially of preliminary colostomy either in the mid portion of the transverse colon or near the hepatic flexure. A double barrel colostomy is done according to a definite technic and none of the fecal current passes over into the distal segment. The distal part of the colon then can be emptied by irrigation both from above and below and at the proper time the surgical procedure can be carried out. With such preparation a much better type of operation can be done on the lesion itself. A sutured anastomosis can be safely accomplished on this defunctioned colon and after the anastomosis is healed, fecal current can be reestablished by closing the colostomy. This is an excellent article and should be read by those interested in this branch of surgery.

E. T. EVANS, M.D.

Dr. Evans reviewed the development of reconstruction surgery for the rehabilitation of the ununited fracture of the neck of the femur. As a recent advance in this type of surgery he presented one of nine cases on which the McMurray trochanteric osteotomy had been performed.

NOTES ON SOME RECENT ARTICLES OF MEDICAL INTEREST

C. A. MCKINLAY, M.D.
MINNEAPOLIS, MINNESOTA

It is obvious that there has been an increased emphasis upon nutritional deficiency diseases. Those who have read that delightful narrative of the sea of one hundred years ago, *Two Years Before the Mast*, by Dana, will recall that on the last

lap of the journey around Cape Horn from California they were hastening homeward with full sail; for, beside the natural desire to get home after an absence of two years, scurvy had begun to show itself on board. "One of the crew was in a dreadful state. His legs swelled and pained him so that he could not walk, his flesh lost its elasticity so that if it were pressed it would not return to its shape and his gums swelled until he could not open his mouth. His breath, too, became offensive; he lost all strength and spirit, could eat nothing; and grew worse every day and could not long survive." Hailing a passing ship, the crew obtained fresh provisions, potatoes and onions, for which they were perfectly ravenous. "It was like a scent of blood to a hound." The one of the crew with severe scurvy was given at the start the juice of raw potatoes until he was able to eat. So rapid was his recovery that in ten days he was at the masthead furling sails. It is of interest in the day of manufactured vitamin products that high grade vitamin deficiency was cured simply by the addition of potatoes and onions. It would seem that deficiencies with minimal manifestations should respond to adequate diet of protective foods irrespective of the use of supplemental vitamin combinations. One hundred years after this journey taken as an illustration of scurvy at sea, cevitamic acid, thiamin chloride and other vitamins, the substances lacking in salt provisions, have been synthesized in crystalline form.

Wright, in considering cevitamic acid, notes that deficiency may exist under a variety of conditions, where the intake is adequate, as in the infections, in conditions with increased metabolism and where there is interference with absorption and utilization from the gastrointestinal tract. Scurvy is considered to be a late symptom of vitamin C deficiency. Abt and Farmer note that there have been numerous suggestive reports of the role of vitamin C in the infectious diseases, but that the evidence is not clear-cut. They note that an ample diet has long been recommended in febrile conditions.

Williams and Spies recount that vitamin B_1 appears to play a part in the metabolism of every living cell, plant and animal; that the nervous manifestations of beriberi are merely the extreme evidence of a lack which is equally felt in all tissues, that the vitamin requirements are proportional to the non-fat contents of the diet, that vitamin concentrates are so variable in B_1 content that thiamin chloride, always of known potency, be used where B_1 is indicated.

Minot, in an excellent article on nutritional deficiency, emphasizes that the greater the chemical activity the more rapid is the depletion of these substances. If the ratio of vitamin B_1 intake in units to caloric intake, as shown by Cowgill, is lessened, deficiency is more liable to occur as is well illustrated by the addition of one pint of whiskey daily which, by adding 1600 calories without other food elements, lessens the ratio and increases the liability to neuritis. The reduction of this ratio may likewise occur as in the case reported by Minot with overeating chiefly of carbohydrates and fat, with development of B_1 deficiency neuritis relieved simply by weight reduction from dietary control. Jollife notes that beriberi in the United States is usually classified as alcoholic, gestational, diabetic, metabolic, or gastrogenous neuritis. One-third of their subjects with polyneuritis had cardiovascular disturbances. Frazer and Ravdin, in a study of the preoperative management of hyperthyroidism, noted that following the addition of thiamin chloride and brewers yeast daily, improvement occurred to the degree that the pulse rate was reduced, that the patients gained weight, and that the length of time for preparation was shortened compared to the control group. With regard to the growth promoting factor of the vitamin B complex, the dramatic results reported by Matthews in pellagra after the use of nicotinic acid should be mentioned. Snell and co-workers have reported the beneficial effect of vitamin K combined with bile salts in the treatment of the hemorrhagic diathesis in jaundice.

Conservative notes have been struck by critical observers with regard to focal infection and systemic disease. Ash studied the influence of tonsillectomy on the course of rheumatic infection in 522 children observed during a 14-year period and noted that neither the presence or absence of tonsils at the time of the initial infection nor the removal of the tonsils subsequent to the onset had any demonstrable influence on the incidence of cardiac involvement or death rate. Cecil and Angevine reported a study of over 200 cases of rheumatoid arthritis in which chronic foci of infection, when found, were eradicated without demonstrable benefit and concluded that chronic foci played a comparatively unimportant role. They state that the time has come for complete revaluation of the focal infection theory. Reimann states that he has attacked the theory of focal infection pertaining to tonsils and teeth in each of the three annual reviews of infectious diseases.

The controlled study by Diehl and co-workers of mixed vaccines in the prevention of the common cold has shown that vaccines given orally were without value and that subcutaneously the reduction in the incidence of only 25 per cent would not justify their use. The importance of studies in prevention is realized when we are reminded that most of the illnesses of man are of the respiratory tract with the common cold heading the list.

A new preparation of sulfanilamide, a pyridine derivative, is being studied and has had some clinical use in pneumonia. Marshal and co-workers have recently reported that this compound is toxic to laboratory animals and advise against its use for purposes for which sulfanilamide has been shown to be effective. A report by Waghelstein shows the striking results in meningococcus infection in which, with combined sulfanilamide and serum therapy, the mortality rate was reduced to 12 per cent. Good results continue to be reported in the hemolytic streptococcus infections. Toxic effects following sulfanilamide, chiefly in the realm of the hematopoietic system continued to be reported, such as agranulocytosis with fatal results. Fatalities have also occurred with toxic hepatitis and acute atrophy of the liver. Toxic psychoses are not rare. Watson believes that there is evidence of blood destruction in a high percent of patients receiving full therapeutic doses. Lockwood and co-workers studied the mode of action of sulfanilamide and conclude that its striking effect is depression of the invasive properties of the organisms. The bacteriostatic effect has been shown to be dependent upon the presence of leucocytes.

Eklund and Blumstein report that six cases of human encephalitis occurred in Minnesota in 1937 in one county, where equine encephalomyelitis was prevalent. Riley states that the epidemiological evidence indicates that insect vectors (mosquitoes and possibly other arthropods) play a role in the spread of encephalomyelitis to animals and to man. Tyzzer and coworkers suggest that the main proliferation and dissemination are by migratory birds. They isolated the virus from pheasants and other birds in Connecticut. They state that it may be seriously questioned whether the horse or other domestic animals play any essential role in the perpetuation of this disease.

With regard to the common use of cigarettes, it is of interest that Hines and Roth have noted, after a standard test of smoking two cigarettes, elevation of blood pressure in a majority of individuals. Excessive rises were noted only in individuals who had hyperactive vascular systems.

News Items

Dr. Samuel Werner of Chicago has opened an office in Billings, Montana. Dr. Werner is a native of Billings.

Dr. B. J. Hughes, a graduate of the University of Minnesota Medical School, 1937, is now practicing in Rolla, North Dakota.

Dr. E. W. L. Rich, formerly of Grand Island, Nebraska, is now practicing in Billings, Montana.

Dr. J. F. Quinn of Waubay, South Dakota, has moved to New Effington, South Dakota.

Dr. W. H. Bodenstab, Bismarck, is the new medical adviser for the North Dakota Workmen's Compensation bureau. He succeeds Dr. F. B. Strauss, also of Bismarck.

Dr. C. H. Sherman, formerly of Oakes, North Dakota, has moved to Bayport, Minnesota, where he is associated with Dr. E. V. Strand.

Dr. Charles E. Nagel has resumed his practice in Great Falls, Montana. He was recently admitted to the International College of Surgeons.

Dr. G. G. Sale, of Missoula, assistant health service physician at Montana State University, has resigned to accept a residency in otolaryngology at the Minneapolis General Hospital. He had been on the University staff for two years.

The lives of at least fifteen North Dakota babies have been saved during the past four months as a result of the new incubator program launched by the state medical association in coöperation with the University of North Dakota and the state department of health. This estimate was made by Dr. John H. Moore, chairman of the medical association's committee on maternal and child welfare.

The University of Wisconsin Medical School will conduct an *Institute for the Consideration of the Blood and Blood-Forming Organs*, September 4 - 6, 1939. The program will include papers and round-table discussions by European and American workers in the field of hematology. A detailed program may be obtained by addressing Dr. Ovid O. Meyer, Chairman of Program Committee, University of Wisconsin Medical School, Madison, Wisconsin.

Judge Vince A. Day, Minneapolis, was elected president of the Minnesota Association for Crippled Children and Disabled Adults, and its affiliate, Lone Craftsmen, at the annual board meeting held in June.

The Flathead County (Montana) Medical society held its annual dinner meeting June 8, 1939, at Kalispell. Problems confronting the medical profession in the state were discussed by D. J. C. MacGregor, Great Falls; Dr. Harold W. Gregg, Butte, and Dr. Thomas L. Hawkins, Helena.

Dr. L. W. Katzberg of Fergus Falls, Minnesota, is now practicing in Spring Valley, Minnesota.

Dr. Charles E. Lyght, Director of the Student Health Service at Carleton college, Northfield, Minnesota, gave the principal address at the annual Carleton cap and gown day service recently. He was chosen, according to custom, by vote of the senior class.

Dr. Francis Chermak has become associated with Dr. R. F. Werner in International Falls, Minnesota. Dr. Chermak, a graduate of the University of Minnesota Medical School, is a former resident of Proctor, Minnesota.

Dr. E. J. Kaufman has returned to Appleton, Minnesota, where he has resumed the practice of medicine in the firm of Drs. Kaufman & Kaufman.

Dr. I. L. Mitby, formerly of Hibbing, is now located in Aitkin, Minnesota, where he has taken over the practice of Dr. B. W. Kelly.

Dr. W. A. Fansler, Minneapolis, recently addressed the following medical societies on the subject of rectal diseases: St. Croix County, New Richmond, Wisconsin; Wright County, Monticello, Minnesota; Richland County, Wahpeton, North Dakota. Dr. J. K. Anderson, also of Minneapolis, spoke on the same subject before the following: Nebraska State Medical Association; Lyon-Lincoln County medical society, Marshall, Minnesota; East Central Minnesota medical society, Pine City.

Pre-school age children of Dillon, Montana, received free physical examinations at the annual summer round-up sponsored by the Dillon Parent-Teacher association last month.

Necrology

Dr. Benjamin W. Kelly, 65, of Aitkin, Minnesota, died at his home June 4, 1939. He had practiced in Aitkin for 40 years.

Dr. A. H. Thornton, 65, of Edgemont, South Dakota, died May 22, 1939.

Dr. George Grant, 65, of Wishek, North Dakota, died May 20, 1939. Dr. Grant had practiced in south-central North Dakota for the past 35 years.

Dr. James Christian Figenshau, 65, of Billings, Montana, died June 13, 1939. Born at Eau Claire, Wisconsin, Dr. Figenshau spent his boyhood in Grand Forks, North Dakota. Before coming to Billings, eight years ago, he had practiced in Miles City.

Dr. Harold F. Neilsen, 34, of Minneapolis, Minnesota, died May 23, 1939. A graduate of the University of Minnesota Medical School, Dr. Neilsen had practiced in Minneapolis since 1932.

Dr. E. E. Cress, 54, of Boyd, Minnesota, died May 14, 1939. A graduate of Northwestern University, Dr. Cress at one time practiced in Woodworth, North Dakota.

Dr. H. H. Thompson, 54, of Minneapolis, Minnesota, died May 22, 1939.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON MAY 11, 1939

BY EXAMINATION

Name	School	Address
Balmer, Albert Irwin	U. of Minn., M.B. 1938	Pipestone, Minn.
Baumann, Milton Charles	U. of Ill., M.D. 1937	No. Mich. Tb. San., Gaylord, Mich.
Beach, Northrop	Harvard Med. Col., M.D. 1938	University Hospital, Minneapolis, Minn.
Berry, Maxwell Rufus, Jr.	Cornell U., M.D. 1935	Mayo Clinic, Rochester, Minn.
Blair, Herbert Milton	U. of Minn., M.B. 1938	Ancker Hospital, St. Paul, Minn.
Braun, Ohrmundt Carl	U. of Minn., M.B. 1939	Mpls. General Hospital, Minneapolis, Minn.
Campbell, Lorne Alexander, Jr.	U. of Minn., M.B. 1938	Eloise Hospital, Eloise, Mich.
Chapman, Asher Spaford	Northwestern, M.B. 1937, M.D. 1938	Mayo Clinic, Rochester, Minn.
Chlad, Arnold Joseph	U. of Minn., M.B. 1938	Ancker Hospital, St. Paul, Minn.
Clarke, Eric Kent	U. of Toronto, M.B. 1916	University Hospital, Minneapolis, Minn.
Clegg, Reed Smoot	Northwestern U., M.B. 1936, M.D. 1937	Mayo Clinic, Rochester, Minn.
Dahle, Manford Benjamin	Rush Med. Col., M.D. 1938	Asbury Hospital, Minneapolis, Minn.
Dressel, Paul Arthur	U. of Minn., M.B. 1939	Elkton, S. Dak.
Eginton, Charles Theodore	U. of Minn., M.B. 1938	Ancker Hospital, St. Paul, Minn.
Erickson, John Walfred	Creighton U., M.D. 1938	Swedish Hospital, Minneapolis, Minn.
Even, Martin Morris	U. of Minn., M.B. 1939	616 N. 18th Ave. E., Duluth, Minn.
Geib, Marvin Jacob	U. of Minn., M.B. 1938	Mpls. General Hospital, Minneapolis, Minn.
Giles, Francis Emmett	U. of Minn., M.B. 1938	Nashwauk, Minn.
Greathouse, John Dallas, Jr.	U. of Minn., M.B. 1939	5042 Colfax Ave. S., Minneapolis, Minn.
Griffin, Vernon M.	U. of Ore., M.D. 1938	Ancker Hospital, St. Paul, Minn.
Gullickson, Miles Justin	U. of Minn., M.B. 1934, M.D. 1935	4212 Lyndale Ave. S., Minneapolis, Minn.
Hartman, Jack	U. of Minn., M.B. 1939	704—15th Ave. S. E., Minneapolis, Minn.
Hill, John Roger	Ohio State U., M.D. 1936	Mayo Clinic, Rochester, Minn.
Howe, Rulon Fullmer	U. of Chicago, M.D. 1937	Mayo Clinic, Rochester, Minn.
Huebner, Jewel Steiner	U. of Wis., M.D. 1938	St. Luke's Hospital, Duluth, Minn.
Johnson, Raymond Alfred	U. of Minn., M.B. 1939	Winthrop, Minn.
Johnson, Vilhelm Manual	U. of Minn., M.B. 1939	Dawson, Minn.
Kapernick, John Stuart	U. of Ill., M.D. 1937	Mayo Clinic, Rochester, Minn.
King, Harry Edward	Western Reserve, M.D. 1936	Mayo Clinic, Rochester, Minn.
Knights, John A., Jr.	Geo. Washington U., M.D. 1936	1775 Van Dyke Ave., Detroit, Mich.
Knutson, George Olaf	Northwestern, M.B. 1937, M.D. 1938	213 Main St., Negaunee, Mich.
Kohlmeyer, Frederick Charles	U. of Minn., M.B. 1939	327 N. Galbraith St., Blue Earth, Minn.
Kyser, Franklin Arthur	Northwestern, M.D. 1938	Mayo Clinic, Rochester, Minn.
Lambert, Lois Ruth	U. of Minn., M.B. 1938	St. Mary's Hospital, Minneapolis, Minn.
Lambertus, Paul Theodore	Rush Med. Col., M.D. 1935	Mayo Clinic, Rochester, Minn.
Larrabee, Walter Freemon, Jr.	U. of Minn., M.B. 1939	Chippewa Falls, Wis.
Larson, Evrel Arthur	U. of Minn., M.B. 1938	Ancker Hospital, St. Paul, Minn.
Licht, Hersh	U. of Minn., M.B. 1938	Mpls. General Hospital, Minneapolis, Minn.
Little, Edgar Hugh	Washington U., M.D. 1937	Mayo Clinic, Rochester, Minn.
Llewellyn, Maxwell Bowler	U. of Minn., M.B. 1939	1599 Stanford Ave., St. Paul, Minn.
Locke, William	U. of Manitoba, M.D. 1938	Mayo Clinic, Rochester, Minn.
Maino, Charles Runston	Stanford U., M.D. 1938	Mayo Clinic, Rochester, Minn.
Mason, Bernard Augustine	McGill U., M.D. 1937	Mayo Clinic, Rochester, Minn.
McCall, Cooper Holtzclaw	Johns Hopkins U., M.D. 1936	Mayo Clinic, Rochester, Minn.
McCannel, Donald Archibald	Rush Med. Col. M.D. 1937	Mayo Clinic, Rochester, Minn.
McCloud, Charles Naumann, Jr.	U. of Minn., M.B. 1939	Ancker Hospital, St. Paul, Minn.
McGee, Horace Duane	Rush Med. Col., M.D. 1938	Ancker Hospital, St. Paul, Minn.
McLoughlin, Christopher John	Hahnemann Med. Col., Phila., M.D. 1937	Mayo Clinic, Rochester, Minn.
Meyer, Wallace Martin	U. of Minn., M.B. 1939	925—1st St., Rochester, Minn.
Miller, Harold Edmund	U. of Minn., M.D. 1937	Mpls. General Hospital, Minneapolis, Minn.
Miller, Harry Allen	U. of Minn., M.B. 1939	134 Homewood Drive, Fairmont, Minn.
Moir, William Wilmerding, Jr.	U. of Minn., M.B. 1938, M.D. 1939	3007 Nicollet Ave., Minneapolis, Minn.
Murray, Robert Alexander	U. of Minn., M.B. 1939	Eitel Hospital, Minneapolis, Minn.
Naegeli, Frank De Lee	U. of Minn., M.B. 1936, M.D. 1937	317 Union St. S. E., Minneapolis, Minn.
Nickel, Walter Russell	U. of Minn., M.B. 1937, M.D. 1938	Mayo Clinic, Rochester, Minn.
O'Donnell, Joseph Edmond	Northwestern, M.B. 1933, M.D. 1934	Mayo Clinic, Rochester, Minn.
Ostergren, Eva-Jane	U. of Minn., M.B. 1938	963 Payne Ave., St. Paul, Minn.
Perry, Thornton Tayloe III	U. of Virginia, M.D. 1937	Mayo Clinic, Rochester, Minn.
Peterson, Osler Luther	U. of Minn., M.B. 1938	University Hospital, Minneapolis, Minn.
Plimpton, Nathan Cope, Jr.	Rush Med. Col., M.D. 1937	Mayo Clinic, Rochester, Minn.
Reader, Donald Richard	U. of Minn., M.B. 1938	St. Mary's Hospital, Minneapolis, Minn.
Richardson, Ralph Dennett	Harvard, M.D. 1935	Mayo Clinic, Rochester, Minn.
Robb, Charles Stuart	U. of Minn., M.B. 1939	2416 Roslyn Ave., Duluth, Minn.
Rogers, Robert Gifford	U. of Minn., M.B. 1939	717—6th St. S. E., Minneapolis, Minn.
Roth, George Clark	Northwestern, M.B. 1937, M.D. 1938	Ancker Hospital, St. Paul, Minn.
Sax, Milton Herbert	Rush Med. Col., M.D. 1937	316½ Grant Ave., Eveleth, Minn.
Schroeckenstein, Hugo Franz	U. of Minn., M.B. 1938	Miller Hospital, St. Paul, Minn.
Smith, Larry Allen	Northwestern, M.B. 1938	Ancker Hospital, St. Paul, Minn.
Sorem, Milton B.	U. of Minn., M.B. 1938	Miller Hospital, St. Paul, Minn.
Sullivan, Arthur William	U. of Ore., M.D. 1938	Ancker Hospital, St. Paul, Minn.

(Continued on page 326)



A Glorious Combination Chesterfield

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LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS ON MAY 11, 1939

(*Continued from page 324*)

BY EXAMINATION

Name	School	Address
Sutton, Edmund Benedict	U. of Vermont, M.D. 1937	Mayo Clinic, Rochester, Minn.
Tischer, E. Paul	Indiana Univ., M.D. 1937	Mayo Clinic, Rochester, Minn.
Twyman, Richard Allen	Northwestern U., M.B. 1937, M.D. 1938	Mayo Clinic, Rochester, Minn.
Vanderhoof, Edward Spaulding	U. of Minn., M.B. 1939	Abbott Hospital, Minneapolis, Minn.
Vinje, Edmund Gordon	Northwestern, M.B. 1938	Ancker Hospital, St. Paul, Minn.
Walsh, William Thomas	U. of Minn., M.B. 1938	St. Barnabas Hospital, Minneapolis, Minn.
Wiig, Laurence Maxon	U. of Pa., M.D. 1933	Mayo Clinic, Rochester, Minn.
Wold, Lester Eugene	Rush Med. Col. M.D. 1938	Ancker Hospital, St. Paul, Minn.
Youel, Milo Ashbel	U. of Minn., M.B. 1939	Lake Park, Minn.

BY RECIPROCITY

Cunningham, Charles Barnard	U. of Mich., M.D. 1934	401—1st St. S., Virginia, Minn.
Kibler, John Martin	Johns Hopkins U., M.D. 1935	Mayo Clinic, Rochester, Minn.
Skarshaug, Harvey James	U. of Iowa, M.D. 1926	Spring Valley, Minn.
Sorum, Frithjof Thorvald	Rush Med. Col., M.D. 1934	Jasper, Minn.

NATIONAL BOARD CREDENTIALS

Barrett, Richard Henry	U. of Vermont, M.D. 1937	Mayo Clinic, Rochester, Minn.
Pennington, Robert Edward	U. of Pa., M.D. 1936	Mayo Clinic, Rochester, Minn.

Minnesota State Board of Medical Examiners

Julian F. DuBois, M.D., Secretary
St. Paul, Minnesota

DOCKET OF CASES

Osseo Farm Woman Sentenced to 4 Year Prison Term

STATE OF MINNESOTA *vs.* ANNA POWERS

On June 9, 1939, Anna Powers, 49 years of age, was sentenced to a term of not to exceed four years at hard labor in the Women's Reformatory at Shakopee, Minnesota, for the crime of abortion. Mrs. Powers entered a plea of guilty on June 1, 1939, after a jury had been selected to try her on a charge of manslaughter in the first degree, following the death, on April 2, 1939, of an 18 year old northeast Minneapolis girl at the farm home of the defendant near Osseo, Minnesota.

The investigation conducted by the Minnesota State Board of Medical Examiners, in coöperation with the sheriff's office and the county attorney's office of Hennepin County, disclosed a number of women, who, upon being questioned, stated that criminal abortions had been performed upon them by the defendant. Shortly after the arrest of the defendant, the young man who stated that he paid Mrs. Powers $75.00 for the abortion in the case that resulted in the prosecution of Mrs. Powers, was found on a road in rural Ramsey county, with a bullet wound in his chest, which had been self-inflicted. The young man, however, made a remarkable recovery and the defendant, upon seeing the number of witnesses for the state on the date the trial opened, changed her mind and plead guilty.

Mr. Herbert T. Park of Minneapolis, one of the attorneys for the defendant, made a rather lengthy plea to the Court in which he asked that the sentence be suspended and the defendant placed on probation in his care. Mr. Park's plea was immediately denied by Judge Baldwin, who pointed out that the state had shown the defendant a great deal of consideration by permitting her to plead guilty to abortion rather than manslaughter. Judge Baldwin also pointed out that the state had available, in the event of trial, a number of witnesses who would testify to other abortions.

The Minnesota State Board of Medical Examiners is very grateful for the coöperation shown by Inspector Andrew Crummy of the county attorney's office, and the splendid handling of the case by Mr. Arthur Markve and Mr. Per Larson, assistant county attorneys. Fine coöperation was also received from Doctors Gilbert Seashore and C. A. Hobbs, Coroner, and Deputy Coroner, respectively, of Hennepin county.

St. Paul Man Pleads Guilty to Illegal Sale of Medicine

Re: STATE OF MINNESOTA *vs.* WILLIAM MCCOY

On April 25, 1939, William McCoy, 34 years of age, entered a plea of guilty in the Municipal Court of St. Paul to a complaint charging him with dispensing, vending and selling, at retail, drugs and medicines without being a licensed pharmacist. McCoy was sentenced to pay a fine of $50.00 or to serve 10 days in the St. Paul Workhouse. He paid the fine.

McCoy was arrested on February 9, 1939, following a joint investigation made by the St. Paul Police Department and the Minnesota State Board of Medical Examiners. The investigation resulted from complaint that young girls and married women were purchasing medicine from the National Health Service Bureau at 1591-1593 University Ave., St. Paul, for delayed menstruation. When questioned at police headquarters, McCoy stated that he was the owner of the National Health Service Bureau and that he had operated it for a little over a year. He also signed a statement admitting that since he had been operating the National Health Service Bureau, he had performed between 20 and 25 abortions for an average fee of $40 per case. McCoy also stated that he was unmarried and lived at 594 Ashland Ave., St. Paul, and that he had resided in St. Paul all his life. McCoy is not licensed to practice any form of healing in the State of Minnesota, nor is he a registered pharmacist.

Neither the Minnesota State Board of Medical Examiners, nor its attorney, were consulted about the final disposition of this case in Court and the Medical Board does not approve of the disposition made. McCoy, at the time of his arrest, was charged with a gross misdemeanor, to-wit: in that he did "wrongfully, unlawfully and wilfully have in his possession, with intent to sell, a drug for causing unlawful abortions." Such an offense is punishable, under the laws of Minnesota, by a fine of not to exceed $500.00, or not more than one year in jail, or both. The Medical Board feels that this is the least that the defendant should have been charged with.

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Advertiser's Announcements

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The second exhibit, on Allergy, tells, in changing dramatic sequences, three 2-minute dramas of Allergy: *Tommy Todd's Autumn "Colds", Mrs. Tucker's Wheezes, and Baby Bing's Eczema.* By means of an animated question box and dioramas showing typical scenes in the doctor's office, a search for the offending allergic excitant in each of the three stories is conducted through information obtained by questions, scratch tests and an examination of the patient's family tree. An interesting part of the allergy exhibit is an illuminated transparency chart showing in full color, 48 of the most common allergic excitants. A separate series of little pictures invites the visitor to examine commonplace scenes for causes of allergy and then, by pressing buttons, to illuminate the concealed answers.

The whole Medicine and Public Health exhibit, which its sponsors had hoped would prove of interest to the more serious-minded among the laity of Fair visitors, has upset all advance calculations and confounded the experts by "packing 'em in" as fast as any five-star hit. Actual attendance through June 15 was 1,958,909. It would have been larger had human beings been more compressible, because on some days the doors had to be closed during peak hours.

On one day this exhibit actually drew 49 per cent of the total paid Fair attendance, which means that every other visitor to the Exposition saw the talking skeleton, the Carrel-Lindbergh heart apparatus and other features of the exhibit.

Physicians visiting the New York World's Fair are entitled to exclusive privileges in the Professional Club in the same building. Admission is obtained by simple identification as a doctor, without charge, and is only available to physicians and their guests. The JOURNAL-LANCET is on file there.

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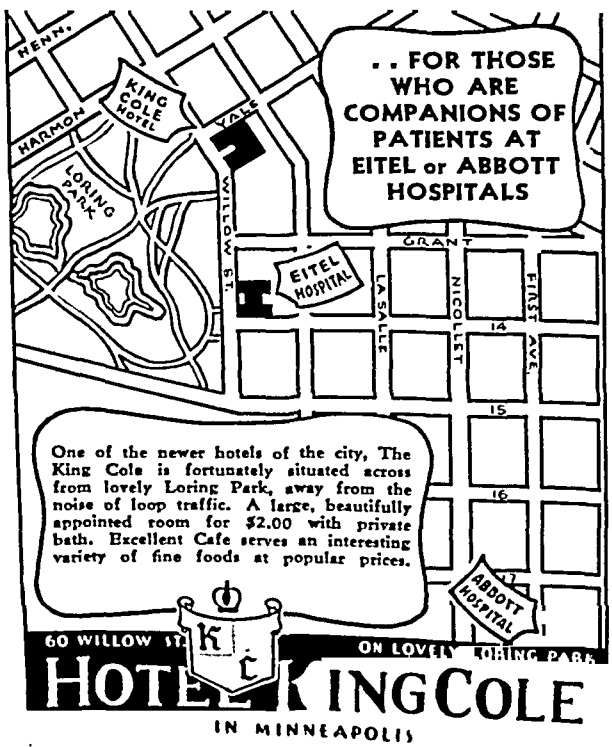
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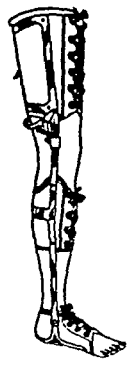
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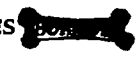
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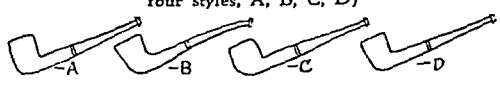
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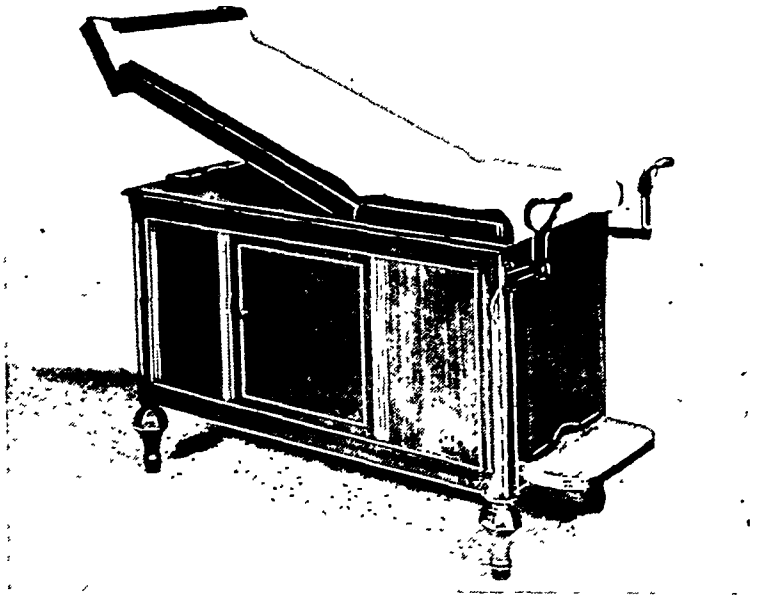
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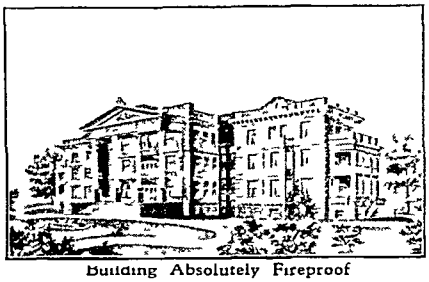
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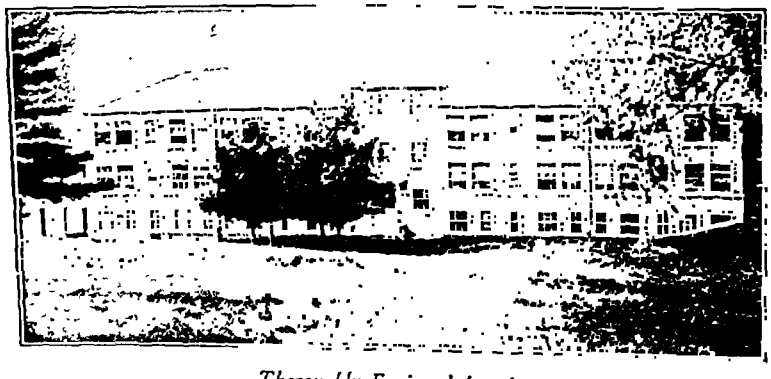
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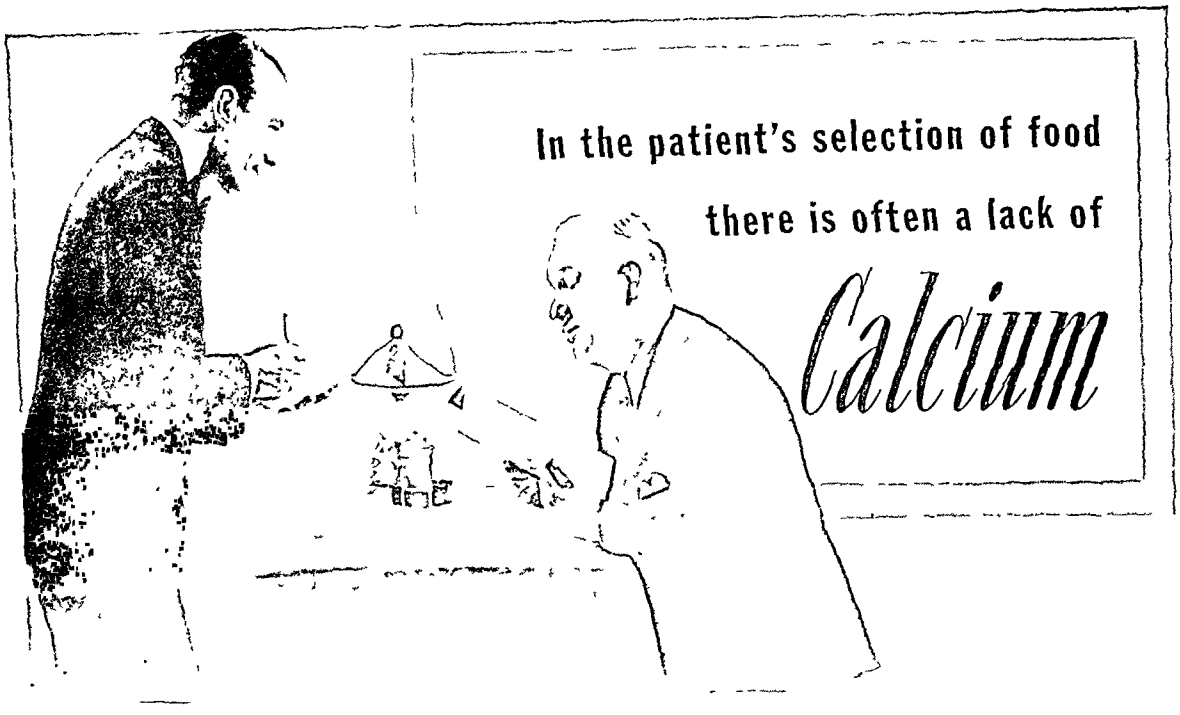
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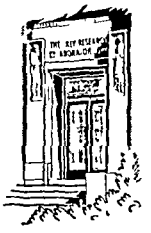
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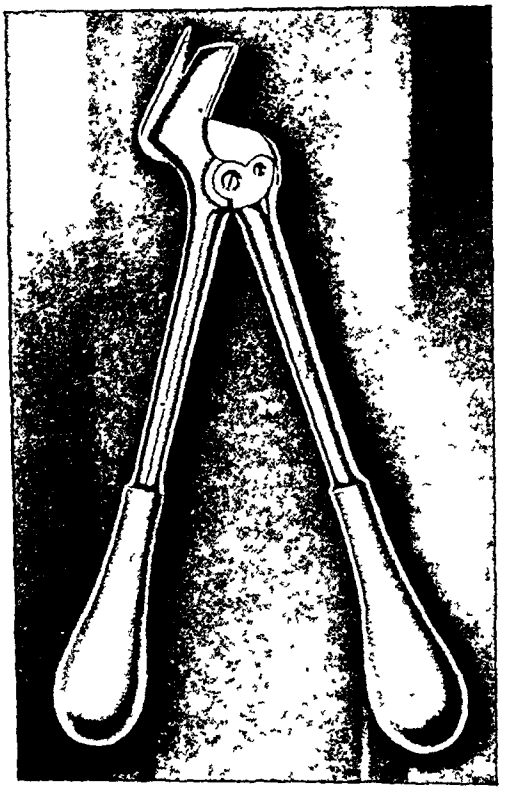
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ADM NUTRITION REVIEWS

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Muscular Dystrophy and Wheat Germ Oil

Mackenzie and McCollum have reported recently in Science [1] their conclusive demonstration that one of the factor, deficiency of which is involved in causing experimental muscular dystrophy in the rabbit, is vitamin E (alpha tocopherol). Their announcement is as follows:

"In 1931 Goettsch and Pappenheimer [a] described a dietary deficiency disease in rabbits and guinea pigs characterized by dystrophy of the voluntary muscles. Morgulis and Spencer [b], Morgulis, Wilder and Eppstein [c], found that at least two factors, both contained in whole wheat germ, were required for the prevention or cure of the disease. One factor was removed from wheat germ, previously extracted with petroleum ether, by 70 per cent ethanol. The other factor was found in the unsaponifiable fraction of wheat germ oil. This suggested that the fat-soluble factor might be vitamin E. However, the dystrophy producing diet apparently contains a significant amount of vitamin E, since both Goettsch and Pappenheimer [a] and Morgulis [d] found that female rats grown and maintained on it exhibited 'initial fertility' in the first and second generations. We have never observed 'initial fertility' in even first generation female rats grown on purified E-deficient diets.

"In this connection our attention was directed to the fat-soluble factor by the observation that the paralysis of the hind legs exhibited by adult rats on a highly purified, E-deficient diet, could be prevented by administration of a highly potent vitamin E concentrate [e]. Our experience confirms Goettsch and Pappenheimer's observation that young rabbits, restricted to their diet 13, develop muscular dystrophy and die. We obtained the same results when 10 per cent of ether-extracted wheat germ was included in the diet. Morgulis [d] noted increased excretion of creatine by rabbits with impending dystrophy. We have recorded the weight, food consumption and creatine excretion, day by day, while rabbits were maintained on diet 13, and have established detailed criteria based on these data, which enable us to predict with considerable certainty when the attack of acute dystrophy will occur. Remedial measures were instituted a few hours before complete collapse was to be expected.

"With these criteria as a basis for diagnosis we were able to produce cures in rabbits on diet 13, plus 10 per cent of ether-extracted wheat germ, by administration of small doses of our vitamin E concentrate [f]. Since the results strongly suggested vitamin E as the curative factor, we next fed natural alpha tocopherol [g]. There was a sharp drop in urinary creatine, accompanied by increased food consumption and gain in weight. Within a few days the animals were able to move about the cages without difficulty, and the creatine output had fallen to the normal level. We have, therefore, shown conclusively that one of the factors, deficiency of which is involved in causing experimental muscular dystrophy in the rabbit, is alpha tocopherol.

"This study is being extended and the results will be published in detail elsewhere.

C. G. MACKENZIE
E. V. MCCOLLUM

School of Hygiene and Public Health,
The Johns Hopkins University."

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PREVIOUS STUDIES

Evans and Burr [2] first reported that a high proportion of the suckling young of mothers receiving an adequate diet, excepting for a lack of vitamin E, developed paralysis affecting the hind limbs and the muscles of the hind quarters. About 35 per cent of the affected animals die, 17 per cent recover perfectly and 48 per cent continue to exhibit paralysis throughout life. The suddenness of the onset is remarkable. Some animals which appear to be definitely normal are seriously affected the following day. In some cases the disease develops so rapidly that death results without any appreciable loss of body weight. Depending on the severity of the disease, a certain proportion of the paralyzed young frequently recovers. Such recoveries occur only in those animals that show the disease in mild form. Excepting for paralysis, survivors live seemingly normal for a significant portion of their life span and breed when vitamin E is administered early in gestation and throughout lactation. The disease is definitely distinguishable from the paralysis due to low vitamin B or from that which occurs in guinea pigs due to low vitamin C, and all of the factors of the experiment point

conclusively to the specificity of vitamin E-deficiency as the cause for this characteristic paralysis.

Morelle (3) completely confirmed the findings of Evans and Burr. The rapid appearance of paralysis suggested the possibility of an infection of the nervous system, but a minute examination was negative to the point where the hypothesis of an infectious origin had to be discarded. Morelle eliminated any relationship of vitamin B to this type of deficiency because of the lack of simplicity of the symptoms and subsequent course of the paralysis and further because it could not be prevented with exceedingly liberal amounts of yeast extract rich in vitamins B and G. The disease observed was attributed to an absence of vitamin E developing in the course of lactation. Morelle sustained the findings of Evans and Burr to the effect that once the paralysis had definitely established itself with reasonable severity it remained incurable in respect to vitamin E or wheat germ oil administration. On the other hand, the preventive action of wheat germ oil obtained by giving the mother this source of vitamin E at variable intervals before she cast the litter and after the litter was born was found to be completely effective if administered ten days before the birth of the litter or as late as 14 days after the birth of the litter. Occasionally, when given two weeks after the litter was born, some of the animals showed a very slight paralysis which, however, disappeared of its own accord. Morelle concluded that the preventive action of wheat germ oil is exercised if the delay in administration to the mother does not pass a period of time greater than two weeks after the birth of her litter.

Olcott and Mattill (4) in their experimental study on vitamin E also observed "suckling paralysis" in the young born from vitamin E-deficient mothers, their observations confirming in every way those made by Evans and Burr. They were unable to alleviate the symptoms, by the administration of wheat germ oil, whether orally or subcutaneously supplied, after they had developed, and very active concentrates of vitamin E from various sources were likewise ineffective. Some animals recovered apparently irrespective of whether treatment was administered or not.

VITAMIN E DISTINCTION

Lipshutz (5) conducted an exceedingly complete examination of the various parts of the nervous system in rats showing suckling paralysis. He distinguished between the changes produced by vitamin E complex degeneration and those produced by vitamin E-deficiency. The two conditions were entirely different. He described in considerable detail the character of the nerve degeneration produced by vitamin E-deficiency which led to paralysis. Evans and Burr indicated in their 1928 report that Dr. R. W. Harvey had examined many of the affected animals and that a more accurate symptomatic and full pathologic-anatomical study of the peculiar and obscure paralysis developed by vitamin E-deficiency was in progress. However, these studies do not appear to have been published so that Lipshutz's work is probably the first publication in this connection.

Olcott (6) presented the possibility that there might be some relationship between suckling paralysis and the muscular lesions which appear in guinea pigs and other herbivora on purified diets as described by Goettsch and Pappenheimer (7), Woodward and McCay (8), Madsen, McCay and Maynard (9), and Victor (10), and accordingly conducted a study of the muscles of the paralyzed rat. At the same time the nervous system of the same animal was also examined. Olcott presented the following discussion of his work; the sudden occurrence of the paralysis in second generation rats in a very specific age group is a baffling phenomenon. Sections from muscles of first generation animals fed vitamin E-deficient diets from weaning and for several months showed no degenerate fibers. On the other hand, second generation animals, which escaped the paralytic symptoms, never developed symptoms later in life although they were maintained on the vitamin E-deficient regime. Sections of muscles obtained from these rats showed an occasional necrotic fiber. This paralysis resembles that observed by Pappenheimer and Goettsch, and by others in guinea pigs and rabbits, in that the lesions are primarily muscular and do not involve the nervous system. Goettsch and Pappenheimer (7) showed that vitamin E concentrates alone did not prevent and could not cure the so-called nutritional muscular dystrophy in guinea pigs. Morgulis and Spencer (11) have recently demonstrated that at least two independent factors are required, one of these factors being vitamin E. If this hypothesis is correct, according to Olcott, it would furnish a possible explanation for the results obtained by Madsen (12) who showed that the inclusion of cod liver oil in diets fed to herbivora markedly increased the incidence and severity of the disease. The oxidative reactions initiated by the auto-oxidation of cod liver oil are destructive to vitamin E (Cummings and Mattill, 1931) and the diets containing cod liver oil possibly had much less vitamin E than those from which cod liver oil was omitted presumably owing to this destruction.

Burr, Brown and Mosely (13) reported the development of paralysis in adult rats which is thought also to be due to vitamin E-deficiency. Heretofore, it has been thought that a lack of this vitamin had no effect on the adult female rat except to produce sterility, although Evans communicated to Burr that adult rat paralysis recently had appeared in his colony of animals and was

attributed also to the lack of vitamin E. The work of Burr, Brown and Mosely is apparently being extended to include a study of the nature of the paralysis, which up to now suggests from microscopic examination that there are indications of changes involving the brain and the spinal cord.

WORK OF MORGULIS AND SPENCER

Morgulis and Spencer [11] used the dystrophy producing diets originated by Goettsch and Pappenheimer designated diet 13. This is made by mixing 350 parts rolled oats, 180 parts wheat bran, 75 parts casein, 80 parts lard, 10 parts cod liver oil, 10 parts sodium chloride and 15 parts calcium carbonate. To one such batch a mixture of 50 cc of a 20 per cent ferric chloride and 100 cc of ether was added in a closed container and allowed to stand, with frequent shaking, for about one-half hour. The purpose of this iron chloride treatment was to destroy vitamin E, according to the method first proposed by Steenbock and Waddell. The food was then spread out in shallow trays and left over night to allow the ether to evaporate. To this there was now added 275 parts of skim milk powder and mixed thoroughly in a mechanical mixer. This diet was prepared fresh at least once a week.

All animals maintained on diet 13 became dystrophic. Rabbits require about 26 days to attain their maximum weight on this diet, while the average number of days on diet 13 before death or at any rate before a moribund condition develops was 34 days.

A diet similar to No. 13, the composition of which is given above, and called diet 11, is prepared in exactly the same fashion with the omission of the treatment with ethereal ferric chloride. Such a diet should therefore contain whatever vitamin E is normally present in untreated diet 13. Goettsch and Pappenheimer report that rabbits react to this diet 11 exactly as they do to diet 13; and Victor [10] in a later publication, cites cases of rabbits becoming dystrophic on diet 11 as early as the 23rd day and as late as the 331st day. In the experiments of Morgulis and Spencer [11], however, three rabbits maintained on diet 11 showed no signs of dystrophy at the end of a period from 69 to 83 days, which does not bear out the conclusion of Goettsch and Pappenheimer.

CURATIVE AND NON-CURATIVE SUPPLEMENTS TO DIET 13

Morgulis and Spencer [11] found that one of the first definite cures for dietary muscular dystrophy was effected by feeding fresh green alfalfa together with diet 13. The work with curative diets which these investigators performed is tremendously interesting and should be carefully studied and considered in connection with the work that has been and is being reported on the relation of wheat germ oil to the prevention and cure of so-called range paralysis.

Fresh green alfalfa together with diet 13 cured muscular dystrophy. However, dry alfalfa, or extracts of fresh green alfalfa did not afford any protection against the development of muscular dystrophy in rabbits fed on this same diet. Thus, dry alfalfa itself is not protective whereas, green alfalfa is definitely a protective agent. Morgulis and Spencer [11] concluded that there is a factor, or that that there are factors present in green alfalfa, fresh, which can prevent the answer to dystrophy; but that this factor, or these factors, are destroyed by the curing process as well as by the extraction methods which they employed in their attempt to determine the value of alfalfa extract.

EXPERIMENTS WITH LETTUCE AND DIET 13

In their attempt to determine the effectiveness of various green foodstuffs in preventing dystrophy, Morgulis and Spencer [11] experimented with diet 13 fed together with fresh, green lettuce. Lettuce was selected for this purpose because it could be procured fresh daily and because it is alleged to have a high vitamin E content. Only fresh green leaves were selected for feeding, each rabbit receiving a total of 50 grams per day, fed in two portions during the day.

All rabbits maintained on diet 13 supplemented daily with 50 grams of lettuce became dystrophic. The time of onset of the disease varied from 30 to 100 days, or averaged 53 days. Thus, feeding of lettuce appeared to have prolonged the period during which the rabbits could be maintained on diet 13 but did not prevent the development of dystrophy. In this respect, fresh green lettuce differed decidedly from fresh green alfalfa. Seemingly, since both greens contain vitamin E, and alfalfa is effective and lettuce is not, it is clear that in addition to vitamin E, something which is present in fresh green alfalfa must supplement vitamin E to be curative of muscular dystrophy. However, a subsequent experiment shatters this conclusion and adds considerable perplexity to the problem.

CURATIVE EFFECT ON DIET 13 WITH LETTUCE AND WHEAT GERM OIL

Morgulis and Spencer [11] had found an earlier work that a combination of lettuce and wheat germ oil was effective in preventing the onset of dystrophy. They studied this combination further by means of curative experiments. Curiously enough, all the animals used in the experiment became dystrophic on diet 13 and lettuce, but they made rapid recovery when wheat germ oil was added to lettuce.

The significance of this experiment is somewhat difficult to interpret. Lettuce alone does not prevent or cure muscular dystrophy. It is a source of vita-

min E. Wheat germ oil alone does not prevent or cure muscular dystrophy. It is also a very rich source of vitamin E. Supplementing lettuce with wheat germ oil does effect a cure for muscular dystrophy.

This experiment recalls the statement recently credited to Shute who, experimenting with humans, reached the conclusion that certain green foods, mentioning particularly water cress, lettuce and spinach, and thought to be good sources of vitamin E, were not effective in preventing complications to pregnancy in the human as compared with wheat germ oil. Seemingly, the vitamin E of lettuce is not equivalent to the vitamin E of wheat germ oil, or, lettuce is lacking in some other factor, different from vitamin E, which wheat germ oil may probably supply.

Returning to the experiments with dry alfalfa, these investigators found that whereas dry alfalfa was incapble of preventing or curing the dystrophy produced by diet 13, it became effective immediately upon supplementing the alfalfa with wheat germ oil.

The summary and conclusion furnished by Morgulis and Spencer includes—

1. "Muscle dystrophy in the rabbit could not be prevented by the addition of the following supplements, singly, to diet 13: Dry alfalfa, a vegetable oil, lettuce, vitamin A (carotene in oil), vitamin E (cold pressed wheat germ oil), or vitamin B (yeast).
2. "Neither the omission of the ethereal-ferric chloride treatment nor the substitution of aqueous-ferric chloride treatment of the basic diet entirely abolished its dystrophy producing effects.
3. "Prevention of muscle dystrophy as well as cure of the dystrophy already developed was effected by feeding the following supplements along with the dystrophic diet 13: Fresh green alfalfa, lettuce and vitamin E (wheat germ oil), dry alfalfa and vitamin E (wheat germ oil) or whole wheat germ. "The experimental results lead to the conclusion that there must be at least two factors involved in the prevention or in the cure of muscle dystrophy. Both factors are present in fresh green alfalfa or in whole wheat germ. On the other hand, one of these factors is supplied by wheat germ oil (cold pressed), while the other is present in lettuce or in dry alfalfa. At least one of the factors is easily destroyed by ethereal-ferric chloride, by drying or by extraction with water or alcohol."

There is much to suggest that the mesodermic dystrophies that appear in the chick and in the rat in consequence of vitamin E deficiency are also in part complicated by requiring an additional and as yet unidentified factor. Thus, in the experiments of Butler and Warren, their report of cures in the case of so-called range paralysis was effected almost invariably in flocks that had access to open range, the open range presumably supplying whatever factor is suggested by fresh green lettuce so that when wheat germ oil supplement was added, responses were definitely secured. However this may be, it is impressive to realize that vitamin E has definitely been characterized as a nutrient, the absence of which contributes to the development of muscular dystrophy; and in this connection it should be emphasized that muscular dystrophy is also influenced profoundly by the amino acid glycine.

Vitamin E is known to conserve the integrity of embryonal muscular metabolism. In the absence of vitamin E and an additional and as yet unidentified factor, nutritional muscular dystrophy develops in certain animals. Lack of vitamin E alone likewise produces impairment of muscle expresed as "suckling paralysis" and as paralysis in adult animals.

Cold pressed wheat germ oil is given in doses fixed empirically at 4 teaspoonsful per day, the amount recommended in the treatment of hay fever ([14]). Excesses of wheat germ oil have never been shown to be harmful in experimental animals, and humans have tolerated very large doses up to 24 drams a day for even considerably prolonged periods of time.

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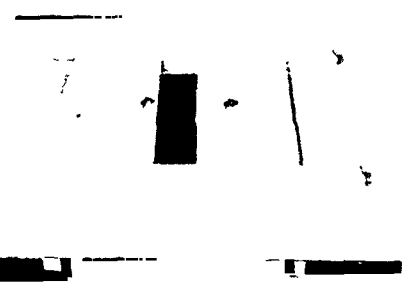
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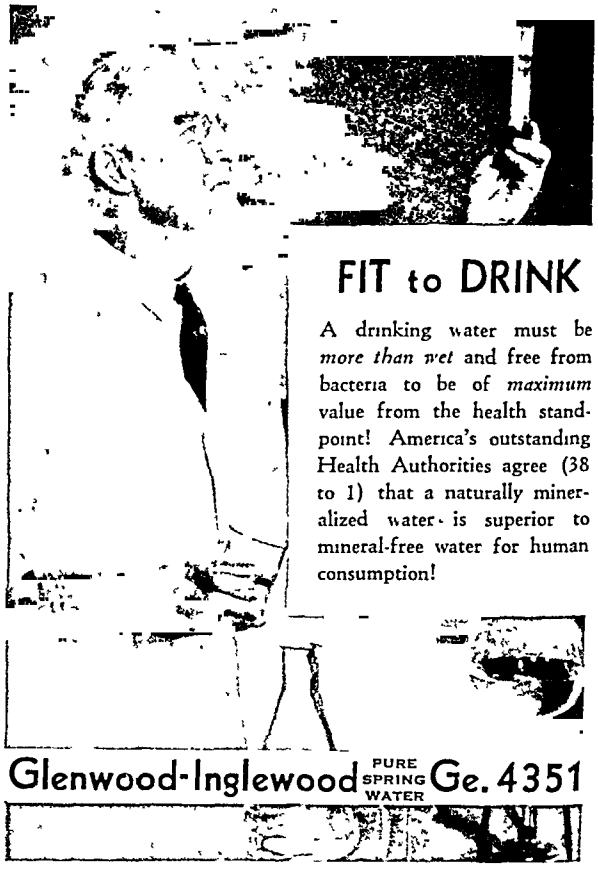
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The JOURNAL LANCET

Minneapolis, Minnesota
August, 1939

Vol. LIX, No. 8
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Transactions of the North Dakota State Medical Association

Fifty-Second Annual Session

Fargo, North Dakota

May 8, 9, 10, 1939

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***Deceased.*

PROCEEDINGS of the HOUSE OF DELEGATES of the FIFTY-SECOND ANNUAL MEETING of the NORTH DAKOTA STATE MEDICAL ASSOCIATION

Fargo, North Dakota

Monday, May 8, 1939

The first session of the House of Delegates was called to order by the President, Dr. W. H. Long, at 10:05 A. M., Monday, May 8, 1939, in the Reading Room of the Hotel Gardner, Fargo, North Dakota.

At the suggestion of President Long, Secretary Skelsey called the roll, and the following officers, councillors and delegates and alternates responded:

Doctors:

W. H. Long, Fargo
Albert W. Skelsey, Fargo
M. MacGregor, Fargo
G. F. Drew, Devils Lake
A. R. Sorenson, Minot
F. L. Wicks, Valley City
N. O. Ramstad, Bismarck
F. W. Fergusson, Kulm
Charles MacLachlan, New Rockford
A. E. Spear, Dickinson
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Frank I. Darrow, Fargo
J. B. James, Page
H. J. Mattson, McVille
W. A. Liebeler, Grand Forks
O. T. Benson, Glen Ullin
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L. J. Seibel, Harvey
W. K. Cuthbert, Hillsboro
H. B. Huntley, Kindred
P. H. Woutat, Grand Forks
W. A. Wright, Williston
A. F. Hammargren, Harvey
A. M. Thompson
A. W. Macdonald, Valley City.

The President declared a quorum present and the House duly constituted for the transaction of business.

Upon motion, duly carried, the Secretary was instructed to send flowers and message of condolence to Dr. George M. Williamson, Councillor of the Third District, and Secretary of the North Dakota State Board of Medical Examiners, then confined to an hospital.

On Motion, duly seconded, and carried, the Transactions of the annual meeting, May, 1938, as contained in the JOURNAL-LANCET for August, 1938, were accepted.

Secretary Skelsey read the following report:

The Annual Report of the Secretary

Mr. President and members. For the calendar year 1938 we had a paid membership of three hundred and ninety (390). This year, up to May 8th, we have already a membership of three hundred and eighty-seven (387). Detailed statement of receipts is attached to this Report.

The American Medical Association, its opponents, lay and medical: Despite vicious bombardments against our national organization, its membership is now the highest on record,—112,210. For centuries past the physicians have enjoyed the humor and the satirical slurs directed against them, in prose, poetry and off the stage; but it is hardly conceivable that in any period has there been such a terrific barrage as now. The American Medical Association and its officers are lambasted from all sides. They have been called a dictatorship, vindictive, and as bitterly opposing allegedly necessary health measures, local and national. Even Washington, D. C., has played politics, and through its Assistant Attorney-General Arnold has filed suit against that organization, alleging a Trust, hence violating the Federal law against monopolies. Demurrer thereto has been filed by the American Medical Association, yet it will be put to some decided and unnecessary expense in contesting this suit. (By this time you may have noticed that the subscription price of the *Journal* has been increased to $8.00.)

Health Propaganda from Governmental and Lay Agencies: A massed meeting of the bulky Interdepartmental Committee, instituted some time ago by President Roosevelt, was held in Washington, D. C., last summer. According to our official headquarters, the medical profession was not given much say, in the way of preparation of the lengthy programme, nor very much consideration at the meetings themselves. Among the fantastic plans then brought into the daylight were those contemplating for nation-wide medical service, an annual appropriation of Eight Hundred and Fifty Million Dollars ($850,000,000) for a consecutive period of ten years, or a total of Eight *Billion,* Five Hundred Million Dollars,—presumably to be handled and maltreated through political agencies. Opposing such plans and excessive outlays until proved necessary and placed under proper control, the American Medical Association had a special meeting of our national House of Delegates, in Chicago, last September, and there discussed the various features involved; appointed a committee authorized to confer with President Roosevelt, and to request that an equally numbered committee be in turn selected by him to represent the Federal government and those others tied up with the various propositions; all for joint conferences. This year U. S. Senator Wagner introduced a Bill into Congress, which is stated to be very much more conservative than that proposed at large by the interdepartmental bodies. Final action not yet reached. In what is intended, apparently, to be seriously considered is a proposition that there shall be entitled to nation-wide medical care, all persons receiving $3,000.00 annually and below that sum. This might effect and also affect at least about eighty per cent (80 per cent) of the whole population in these United but bewildered States.

In connection with the onslaught against the medical profession, and the seeming attempt of the federal and the state governments to place the profession on hot coals, and attempted regimentation, we call attention to the countercharge against this, by quoting the following extract from Democratic National Congressman Samuel B. Pettengill in his book, *Jefferson, the Forgotten Man,* published by America's Future, Inc., 205 East 42nd St., New York: (Chap. 8, Exhibit A., Washington, D. C.)

> "Before proceeding to obliterate the states, counties, cities, and towns; before wiping out the last trace of local responsibility of cities and of citizens, and turning over to the Great White Father at Washington, the welfare of one hundred and thirty millions of people, let us see how Washington, D. C., is run. Let us take a look at the demigods of Federalism behind the scenes.
>
> As Exhibit A of the blessings of centralized government, all-wise and all-powerful, in which our people have such a child-like faith, Washington, D. C., is an excellent case study. . . . Having said this, let us take a closer look at Washington, the capital of the nation, the baby of Uncle Sam. Let us go through this experimental station of Federal government. Let's see how Uncle Sam has raised his own baby. It will be our worth while before we turn our babies over to his tender care; before we abandon state rights to his protection. . . . Every community is first of all interested in its own health. . . . How about Washington and the health of the people who live in our Federal city?
>
> For the year 1936 per 100,000 population, the vital statistics of Washington and the nation show that the death rate in the District of Columbia was twenty-six (26) per cent higher from cancer than the same death rate in the whole United States:
>
> 27 per cent higher from heart disease;
> 49 per cent higher and going up, from pneumonia;
> 92 per cent higher from tuberculosis;
> 106 per cent higher from alcoholism;
> 119 per cent higher from syphilis.
>
> So, on this vital question of health, put down the home of

the federal government on one side, and on the other side the average of health conditions throughout the rest of the nation. Then ask yourself, whether the federal government is doing such a good job in comparison with what is being done in your home town, as to lead you to want it (national government) to take complete responsibility for the health of your children.

For every one thousand live births in the District of Columbia, the infant mortality is twenty-six (26) per cent higher than that of the whole United States, and the maternal death is ninety-one (91) per cent higher. Perhaps I should again remind you that I am giving figures about Washington, D. C., *not* one of the abandoned coal towns of West Virginia or a mill town in the South. *These* are the figures of the model city of a benevolent paternalism."

Unfortunately, in their efforts to fall into complete line with some of the Washington dictates and statements as to the inferiority of the medical profession, it appears that in certain states some of the local medical societies are soliciting and pressing for financial grants from the national-state governments for conditions and projects which are entirely within the bounds and the scope of the profession itself. For instance, here we call attention to a communication just received. It seems there has been developed, among some of the profession, a national so-called Postgraduate-Work Association, which apparently aims to guide the erring, neglectful, and under-educated member of the medical societies, in that he may not be too decided a burden to the community and to himself, as well as a disgrace to the profession,—even though a product of our best universities. There is of course, and very decidedly, no question about the necessity of our fraternity keeping themselves well posted in their professional work, whether as a general practitioner or as one of those who have gone into the many-sided specialties. But the interesting part of the communication above referred to is that along with its invitation that our delegate to the national American Medical Association St. Louis convention, May 15 to 19, 1939, participate in a luncheon with the postgraduate body, there is included notice of the following proposition to be discussed and settled:

"Q. 4: Should the *government* or organized medicine, *either* or *both*, at some future date require some form of postgraduate study for the *renewal of license to practice medicine?*

Is there any doubt how our own House of Delegates would instruct our national delegate to answer this inquiry from an outside organization, entirely distinct from the national orgainzation, the American Medical Association?

Medical Economics and the State: As the subject of our Understanding with the federal-state authorities looking to emergency medical care of those families in the drought areas, we write the following into our records: Some of the local societies have expressed through the State President or the State Secretary their dissatisfaction with the workings of the plan; their main objections being the *pro rata* feature, which has reduced the payment to the physicians to a very low level; and secondly, to the fact that such physicians have been unduly loaded with card-bearing clients. Under instructions from President Long, based also on request from the Committee on Medical Economics, we sent circular letters, and included four propositions which we requested the societies to study, and to instruct their delegates accordingly, for the state meeting. So recently as May 5th, 1939, the Committee on Medical Economics and Drs. Long and Skelsey met in Bismarck, repre*sentatives of the government, and discussions were had, in an* endeavor to decide whether or not the whole plan of the Understanding should be abandoned, or whether some different form of medical care and proper payment therefor, be developed.

Regional Director, Mr. Ward; State Director, Mr. Maddock; Dr. Williams, the governmental representative from Washington, D. C., entered into the discussions, and it was admitted by them that due to the fairly short time allowed prior to the development of these plans, very probably too much high pressure had been exerted, in order to get the farmers to sign up and to get proper knowledge of *what such clients were to be* allowed medical care under the proposed agreement. Promise is now made by them that they have been starting a pruning-out process, in the belief that (1) the clients will be much better instructed; and (2) that possibly there will be many less allowed cards.

In an earnest effort to improve medical economic conditions, several of the state associations, as well as such organizations as the Ontario Medical Society, are developing plans which they hope will be practical. Some of these are described in the *Journal of the American Medical Association*, the plan generally being designated by the name of the state participating. However, it seems very clear that from out of all this turmoil, as well as the defamation generally of the profession, at least the younger generation have come to the conclusion, now and henceforth, under these changed conditions, the local authorities must be responsible for the totally indigent.

Radio Propaganda by Local Medical Societies. This subject is considered in the annual report of that committee. It may not be amiss to call attention to the topic of publicity, and to raise the question whether such propaganda is worthwhile. There are three types of physicians viewing this subject from different angles: One desires to go along in the former, dignified manner; permitting the profession through its daily work, to show its merit and value. Another type believes that a reasonable amount of publicity would greatly aid the profession. *The third type wants high pressure methods; the spending of* much money, to show the world at large our fervent desire to help it. On the other hand, many of this dear public doubt our actual zeal for the cause of humanity, look askance, and apparently more than ever turn their steps towards the outfit you are decrying. Some societies issue, at intervals, a very large special edition of their city newspaper, devoted almost entirely to the medical profession. One of the larger state organizations issues weekly advance sheets intended for republication by many of the newspapers in their state. Yet we can well believe that the average newspaper and magazine publisher, really dislikes that sort of material; probably pigeon-holes much of it; or permits the yawning wastepaper basket to get its victim.

A few years ago we created a Committee on Public Relations, but soon thereafter in zeal to reduce the number of our state committees, that one went into the discard,—whereas perhaps it would be of better use than some other committees. As the Chairman of the former Committee on Public Relations is one of the delegates to this meeting, the House might desire to get his opinion now.

Our State Medical School. A few days ago that school was inspected by representatives from the Bureau of Education and Medical Colleges, but the Bureau's decision has not yet been made public. The Secretary and his associate stopped off in Fargo, meeting President Long and some other physicians. These Bureau people are anxious to get some accurate information as to how the public itself here feels in regard to the continuance of the School. In Fargo, Secretary Cutter likened the disciplining of the School by his Bureau unto that by which the father disciplines his children,—all for the good. He states that naturally the main object in view, from the standpoint of the Bureau, is to attract public attention to the affair, in an endeavor that the state authorities and the legislature will come to the rescue of the school if they desire it to exist.

The Venereal Diseases Crusade. Uncle Sam and the ladies aiding keep in the headlines to a very decided extent. But there should, it seems, be some home cleansing in governmental circles, as evidenced by the last report on the Health of the Army, which shows that gonorrhea *headed* the list of causes for loss of time, as it has every year since the World War,—accounts now for 194,973 days lost. Venereal diseases are costing the Army more than a million and a half dollars for treatment annually, and are responsible for eighteen (18) per cent of the non-effectiveness due to diseases. It is generally understood that the army and navy authorities warn the men against venereal infections, recommend and also furnish prophylactics, and discipline the fellows singed through toying with Venus.—(J. A. M. A., Apr. 1, 1939.)

The North Dakota Legislature of 1939 has gone into the hinterland. So far as the medical field is concerned, two events were proved:

(1) The medical profession didn't fare very well, despite the frequently repeated wail from the public

that it desired to be protected by that profession from quackery;

(2) The evidence produced, especially in the Senate, showed conclusively the evils of the pernicious system of politically-controlled and regulated state institutions.

The Nation-Wide Medical Survey Requested by the American Medical Association: This was referred to in the State Secretary's annual report of last May. Material for the work was sent in some cases directly by the American Medical Association to the local societies. Also, some forms and several follow-up letters were mailed by the State Secretary to those societies. A few of the district men wrote quite frankly that they did not believe the work involved would justify the result. From some other districts, no reply.

Will the House of Delegates now decide that the subject may be given quiet burial?

Respectfully submitted,
ALBERT W. SKELSEY, M.D.,
Secretary.

State Secretary's report received and referred to the Reference Committee for consideration.

Dr. N. O. Ramstad, President of the Council: Stated that after the meeting of the Council, its report would be delivered to the House of Delegates.

REPORTS OF COUNCILLORS

First District

Dr. M. MacGtegor, of Fargo, Councillor for the First District, presented his annual report as follows:

Since the last state meeting the Cass County Medical Society has held seven meetings from October 28, 1938, to April 24, 1939.

Regular, full membership	69
Associate membership	8

Three new members were added during the year, and five associate members were added. Two members were transferred to other societies. A resolution regulating elections of new members to the society was adopted at the November, 1938, session, to the effect that all persons elected to membership in the Cass County Medical Society will be considered as probationary members for a period of one year, during which time they will have no vote. At the end of one year's time their names will be re-balloted upon, and if passed, they will become full members with all the privileges thereof.

An active radio program, through the courtesy of Station WDAY, Fargo, was carried out during the greater part of the year. The Society took an active part in the Public Forum meetings held in Fargo during the winter months. At one meeting Medical subjects were discussed exclusively, the principal topic being Medical Economics in its relationship to the Farmers Mutual Aid Corporation. Most of the Scientific discussions were furnished from our own members.

The Society had the honor of entertaining at the December 22 dinner meeting seven of the newly elected legislators and senators to the North Dakota Legislative Assembly, from our district. Invitations were issued to all twelve of them but only seven were able to attend. At this time Basic Science Legislation was discussed freely by our members in order to present before the Representatives our views regarding such legislation. Keen interest was shown by our guests concerning medical legislation and all of them expressed themselves, some favoring the enactment of a Basic Science Law, some non-committal. All, however, promised to give the subject their earnest study and thoughtful consideration when such proposals came before the legislative assembly during the next session. We are unable to state the results gained by this friendly gesture as expressed in the votes on medical problems by our representatives. It appeared to be a logical way of approaching the problem with the expectation of obtaining the results we desired and we feel justified in recommending to the other societies of the State Association that they follow some such system in the future.

Medical Economic Problems have been the subjects of discussion more or less constantly during the year. The indigent portion of our population continues to be certified to by the Welfare Board for medical care and still receives their medical care from physicians employed at a salary to furnish such care. The Farmers Mutual Aid Corporation it appears to us has failed, not only the Medical Profession which entered into agreement with it in good faith, but also the public which it was intended to serve and which feels itself so cruelly deceived.

We are pleased to learn that a few of the societies have taken a positive position against renewing further agreements with the Corporation after its expiration on June 30. Some of these societies are located in the very heart of the regions of the state in greatest need of assistance and it is their considered opinion that the system is more detrimental than beneficial to all parties concerned. Cass county has not taken so firm a position but there is a growing sentiment among quite a few of its members that it should do so. However, our delegates have been instructed to take a compromising attitude in presenting this matter before the House of Delegates at this Assembly.

Some discussion has been given at various times during the year to the subject of Maternal and Infant Mortality. Statistics are still described as *appalling*. Refresher courses of postgraduate study have been outlined and carried out for the purpose of improving these statistics. Our Society has coöperated well with these agencies. For many years now we believe there has been a tendency to charge the general practitioner with the high mortality and morbidity rate among mothers and infants. The general profession which constitutes the great bulk of the physicians of the nation has raised little or no defense for themselves against these implications. Is it not about time for them to do so? For instance, in this state the strongest and most active committee is the Committee on Maternal and Child Welfare. The committee is made up of specialists in its own field of practice. It has received and used the support of the State Association, the State Health Department, and has organized refresher courses and has seen its specialty grow to the extent that for several years now practically all of such practice has been in the hands of the so-called specialist. It has even been encouraged and abetted by Federal agencies and Federal grants, first through th Shepard Towner act, and later through Federal general health conferences at Washington, and even through Social Security aid; and yet the conditions nationally are described by them as appalling. Where then should the real responsibility for such failure lie? Should we admit frankly that the problem is incapable of solution, or *should we* continue to subscribe to the blatant optimism of paternalism and lead our people to believe that all their problems will be solved for them by the specialist, and still carry the responsibility of failure on our own shoulders?

Respectfully submitted,
MURDOCK MACGREGOR, M.D.,
Councillor, Cass County Medical Society.

Second District

Following is Devils Lake District Medical Society report for the year 1938:

The Devils Lake District Medical Society has held three meetings, all at Devils Lake. Have taken in three new members and lost three by nonpayment and have two applications pending.

Our first meeting was taken up with the consideration of the American Medical Association survey of medical service in our district which we tried to coöperate with as well as possible. At our second meeting we decided to continue this survey and discussed our relations with the F. M. A. and decided to comply as best we could with the present arrangement. Dr. Sedlacek of Ft. Totten gave a very interesting talk on Trachoma, showing before and after pictures of cases treated by sulfanilamide according to Government regulation, which showed remarkable improvement.

At our March meeting we elected officers for the coming year and appointed Dr. Olafson to attend the course in Obstetrics given by the Center for Continuation Study, University of Minnesota, and passed a resolution instructing our delegate to favor discontinuation of the blue card system as now being used, and a copy of this be sent to each local society, requesting a like action by them.

Our meetings have been very interesting and well attended. We have no dissention of any kind, and can coöperate with everything except the Farmers Mutual Aid.

We reported twenty-eight members, the same as the previous year.

Yours fraternally,
G. F. DREW, M.D.,
Secretary, Devils Lake Dist. Med. Soc.

Third District

(No report received, Dr. G. M. Williamson, Councillor, being in an hospital.)

Fourth District

Dr. A. R. Sorenson read the following Councillor's report of the Fourth District:

The Northwest District Medical Society held eight meetings during the year, which were uniformly well attended. Good programs were rendered at each meeting. This was due in great part to an innovation which was adopted early in the year. Our sessions alternate between the two general hospitals of the city, and a committee was appointed from the staff of each hospital, whose duty it was to provide evening's program. That one might not be outdone by the other, each committee was on its toes to provide well-worth entertainment. Medical economics peculiar to our state came in for frequent and lively discussion. The society went on record as disapproving a continuance of the present F. M. A. C. set-up, and recommending that all members cease honoring the blue cards after March 1, 1939. The latter was quite generally adhered to. The delegates to this state meeting were instructed to oppose any new arrangements that could not promise to pay in full on any agreed fee schedule.

Eight new members were admitted to the society. One was lost by death, and one by removal from the district. On the whole, we feel our society is an active one and that membership in it is distinctly worthwhile from both an economic and professional standpoint.

A. R. SORENSEN, M.D.,
Councillor.

Fifth District

The Traill-Steel Society has a membership of nine, with all dues paid for the year. None has been lost by death or removal. One man has come to the territory, and has signified his intention of becoming a member.

In addition to the regular meetings of the Society, which have been well attended, six of the nine members attended the "refresher courses" on obstetrics and pediatrics, held at Grand Forks Oct. 20th and 27th, 1938.

The following doctors serve as officers: President, A. A. Kjelland, Hatton; vice-president, C. A. Hjelle, Portland; secretary-treasurer, Syver Vinje, Hillsboro; delegate, W. H. Cuthbert, Hillsboro; alternate delegate, R. C. Little, Mayville.

In the Sheyenne Valley Society, fourteen doctors hold membership, being a gain of one during the year. There have been no losses by removal or death.

One suit of malpractice came to trial against a member during the year, and this resulted in a verdict for the doctor.

Seven meetings have been held—most of these being called for specific purposes; to hear reports of the delegates to the state medical meeting of '38; to consider service to students of the college and High School; to act in a case of illegal practice in the territory; to study legislative matters; the F. M. A. C. set-up, and to prepare a memorandum to the State Secretary regarding the latter; to choose our representative to the course at the U. of Minn. on obstetrics—this being Dr. Will H. Moore, with Dr. Wm. Campbell as alternate.

At one meeting a resolution was prepared in answer to a letter from the Secretary of the County Welfare Board—in which the Board wished to have the medical committee to consist of one man—with appointment by the Board.

Such action was against the wishes of the local society, and the action was withdrawn.

A study was made of the letters from the State Secretary regarding Radio programs, and committee was appointed to report the results of their findings.

Regarding the F. M. A. C. set-up and its continuation—plan number three was chosen as best.

Pursuant to the idea of the Telephone Company the society voted to withdraw the word "doctor" in the listing of names in the directory.

The following doctors hold office:

President, A. W. Macdonald; vice-president, E. A. Pray; secretary-treasurer, Will H. Moore; delegate, Will H. Moore; alternate delegate, A. W. Macdonald.

Respectfully submitted,
F. L. WICKS, M.D.,
Councillor.

Dr. WICKS: There's just one thing I'd like to report. Dr. Robert E. Pray of our Society presented the "Program for the Management of the Premature Infant" on May 3rd. This was a dinner meeting and well attended.

Sixth District

Dr. N. O. Ramstad read the following Councillor's report of the Sixth District:

The Sixth District Medical Society had a paid-up membership of sixty-eight on May 1, 1939.

During the last year we lost two members by transfers to other states. There were no deaths among the members. Dr. Willis Shepard transferred to Oregon, and Dr. Ralph Vinje to Minnesota.

New members admitted during the year were Dr. Mark Williams of Linton, who transferred from the Southwestern Medical Society; Dr. R. H. Leavitt of Carson rejoined this society after a few years' absence in California; Dr. Carl Baumgartner, Dr. Alton Grorud and Dr. E. D. Perrin of Bismarck, and Dr. M. S. Jacobson of Elgin were elected to membership during the year.

Five meetings were held with an average attendance of forty. Much credit must be given to many of our members who seldom missed a meeting in spite of residing a long distance from the place of meeting.

We had three guest speakers during the year to whom we are greatly indebted for inspiring addresses: Dr. W. H. Thompson of the University of Minnesota, Dr. M. A. Shillington of Glendive, and Dr. Ralph Pray of Fargo.

A fine spirit has prevailed during the year and much interest has been taken in our medical society meetings.

N. O. RAMSTAD, M.D.,
Councillor, Sixth District.

Bismarck, N. D., May 5, 1939.

Seventh District

DELEGATE: Dr. Arzt is out of the room.

(Dr. Arzt's report—not read at this time, but included here.)

Councillor's Report—Seventh District Medical Society

It is a pleasure to report the activities of the Stutsman County Society during the past year.

November 8th, 1938, the Society planned to give ten minute radio talks on each Tuesday with material to be secured from the American Medical Association. At this meeting Dr. G. A. Dodds gave a very interesting illustrative lecture on "Bronchiectasis."

December 1st, 1938, was a very successful meeting with an exceptional attendance, fourteen members and eighteen guests from five of the adjacent districts. The program was given over to Dr. Brandes who spoke on "State Medical Economics," and Dr. Larson, who spoke on "Medical Legislation." A rather spirited discussion followed these talks, which I believe was of marked benefit to all present.

January 27th, 1939, business preceded the usual program, with election of officers for the ensuing year:

President, R. D. Nierling, M.D.; vice-president, George Holt, M.D.; secretary-treasurer, Bertha Brainard, M.D.; censor, T. L. DePuy, M.D.; delegate, S. W. Melzer, M.D.; alternate, Joe Sorkness, M.D.

The speaker of the evening was Dr. Long who spoke on "Common Cardiac Disorders." This was a very enjoyable program, and much good resulted from the way in which this subject was presented.

February 23rd, 1939, Program: Dr. Ricker of Rochester who spoke on "Headaches and Diagnosis."

March 5th, 1939. We had a special meeting which was taken over entirely with business matters. At this meeting there was a very animated discussion in regard to the attitude of the County Society to the F. M. A. C. After considerable discussion pro and con, it was decided that the Society should

send letters to the component societies of the state, requesting the President of the State Society to call a meeting of the officers and committees necessary, so that this contract or agreement with the F. M. A. C. would be abrogated.

March 23rd, 1939, the question of taking advantage of the Obstetrical Conference to be held at the University of Minnesota the first week was considered, and the name of Dr. Bertha Brainard of Jamestown as delegate and Dr. Owen of New Rockford, alternate, were selected. The program at this meeting was by Dr. Wohl of Minot, who spoke and illustrated various X-ray diagnoses.

April 27th, 1939, a business session with further discussion of the F. M. A. C. Inasmuch as no definite action had been taken up to the present time by the State Society, and the delegate and the alternate were instructed as to the present attitude of the Society with present arrangements and any possible further contact with this organization, the program was given over to Dr. Ralph Pray, who presented an excellent paper on the care of prematures.

To recapitulate, the Society has had a very splendid year, seven meetings with a total attendance of one hundred forty-two, and seven guest speakers. Our meetings are all preceded with a dinner and usually one or more medical films are shown during the evening. During the year there have been twenty-seven ten-minute radio programs, given over the local radio station.

Our society has at present twenty fully paid-up members. One member left the city during the year and will probably join the Cass County group.

I think the Society has been very active and has accomplished much in all lines that pertain to the medical practice, and is in excellent financial condition.

Respectfully submitted,
P. G. ARZT, M.D.

Eighth District

Dr. F. W. Fergusson read the following Councillor's report of the Eighth District:

The Southern District Medical Society held three meetings during the past year with an average attendance of ten members present.

Several films were shown at these meetings followed by discussions.

At present there are twelve members in the district. There are three doctors in the district that are non-members but who are eligible. We have had no new men locate in the district but have lost one member, namely, Dr. C. H. Sherman, who left Oakes to locate in Stillwater, Minn.

F. W. FERGUSSON, M.D.,
Councillor.

Ninth District

Dr. MacLachlan read the following Councillor's report of the Ninth District:

Membership, twelve. Dr. Hammargren resigned, to join the Northwest District Society. Officers during the year 1938: President, Dr. Westervelt; vice-president, Dr. MacLachlan; secretary-treasurer, Dr. Van de Erve; censors, Dr. Matthaei, two years; Dr. Crawford,** one year; Dr. Seibel, three years.

The Society held five meetings during the year, which may be summarized as follows:

January, 1938, New Rockford. Reconsidered the disbanding of the organization, and instead, decided to carry on. Officers elected as noted above.

April, 1938, Fessenden. Revision of the Constitution considered, as well as the subject of the Christmas Seals. Politics in our educational institutions condemned. Interesting clinical cases presented and discussed.

September, 1938, Fessenden. Blanks as furnished by the American Medical Association Bureau of Medical Economics distributed. The value of this material was held doubtful, as it was felt that the result would be inconclusive.

Guest speaker, Dr. Layne of Minneapolis, who outlined the scheme of postgraduate instruction offered by the University of Minnesota. Referred to the value of the fellowships offered by the Mayo-Minnesota University, covering postgraduate work. The Doctor also spoke on the subject of contagious diseases and of the value of newer methods of diagnosis and treatment of pneumonia.

November, 1938, Carrington. Eight membership doctors; four visiting doctors, and two dentists. The F. M. A. C. set-up was discussed and a committee drafted a resolution voicing the sentiments of the Society as being opposed to the plan as at present formulated. The introduction of a new basic science law was discussed and advocated, the Society adopting resolutions to be submitted to Chairman Larson of Bismarck. Exhibition of two films, one demonstrating therapeutic exercises of the shoulder joint following dislocation, and one on occupational therapy.

December, 1938, New Rockford. A joint meeting of the physicians, some dentists and some of the legislators of that district, to discuss the legislation affecting the medical profession at the next legislature.

Election of officers for 1939: President, Dr. Boyum; vice-president, Dr. Owens; secretary-treasurer, Dr. Van de Erve; censor, Dr. MacLachlan; delegate, Dr. Seibel; alternate delegate, Dr. Matthaei.

April, 1939, New Rockford. Doctors and nurses. Dr. Pray of Fargo discussed the treatment of the premature and the newly-born infant. Also, there was a discussion of a communication from Dr. Skelsey, State Secretary of the Association, concerning the North Dakota Farmers' Mutual Aid Corporation, asking that our Society give our delegate definite instructions on this subject, for the annual meeting in May, 1939. In general the opinion of the Society was as follows:

They were generally agreed that the amount paid was entirely inadequate; the majority of the Society were against the proposition that each component society deal directly with the Federal government. Some members expressed the belief that actually many farmers now covered by this insurance feature are well able to take care of their own bills for medical services and should do so. No definite action, and the matter will have to be settled in the House of Delegates. However, there was apparently a general agreement that some form of governmental aid is necessary at this particular period, and that it is necessary to meet the problem by getting some payments for services rendered many financially distressed farmers; that this might be a much better plan, than under the former system of taking care of that type, where the account was placed on the books, to be collected at some future time. It was deemed essential that we have a better set-up than at present under the current understanding with the authorities. The statement was made that some farmers would also be much better satisfied were the authorities to pay the doctors more for medical care.

**Deceased.

Tenth District

Dr. A. E. Spear read the following Councillor's report of the Tenth District:

Mr. President, Members of the Council and House of Delegates: As Councillor for the Tenth District, I beg to submit the following report:

We have twenty-six members in good standing this year, this being the same number we had last year. There are two doctors in our territory who are not members. Both of these doctors have applied for membership, but one has been placed on probation for a year as is our usual custom with new members, while the other has been refused membership.

We have held five meetings during the past year and attendance has been unusually good, averaging twenty members per meeting out of a membership of twenty-six.

At our last meeting, April 20, 1939, a resolution was unanimously passed to the effect that we do not favor renewal of any agreement for federal control of medical care in North Dakota.

Respectfully submitted,
A. E. SPEAR, M.D.,
Councillor.

The Treasurer's Report read by Dr. W. W. Wood, and referred to the Auditing Committee.

Additional remarks by Dr. WOOD: I also want to say that I have been Treasurer of this Association for seventeen years, and if it now pleases the members to appoint someone else, it wouldn't hurt my feelings.

President LONG: You ask the Nominating Committee. (Applause indicated that Dr. Wood would have to continue in office.)

Reference Committee

President Long appointed the Committee:

Dr. A. D. McCannel, Chairman,
Dr. A. P. Nachtwey,
Dr. W. A. Liebeler,
Dr. R. H. Waldschmidt,
Dr. Frank I. Darrow,

and announced that if this committee were unable to complete all of the work transferred to them, he would appoint an additional; that the committee would pass on the reports of the standing committees, etc., and whatever resolutions might be brought before them for consideration.

Report of Auditing Committee

We, your Auditing Committee, have examined the annual report of Treasurer Wood, and find it correct.—(Signed): M. MacGregor, M.D., A. R. Sorenson, M.D., A. E. Spear, M.D.

On motion, duly seconded, the Committee's report was accepted.

REPORTS OF STANDING COMMITTEES

1939

The report of the Committee on Public Policy and Legislation was presented by Chairman Dr. W. L. Larson, and accepted.

Secretary Skelsey read the Necrology report.

Necrology Report

In every avenue of human endeavor there comes a time when the workman must lay down his tools; for "the night cometh when no man can work."

As we pause in the midst of our deliberations to pay our tribute of remembrance to those of our fellows who have ceased from their labors it well becometh us to

"Keep silent for a space;
So weak our words they falter on the tongue;
Silence alone befits our memories."

RUTH M. MAHON, M.D.

Dr. Ruth M. Mahon of the firm of Drs. Campbell, Williamson, Benwell and Mahon, Grand Forks, North Dakota, was born in Langdon, North Dakota, May 21, 1896, and died at Livingston, Montana, Sept. 1, 1938. Dr. Mahon was a graduate of the University of North Dakota and of Rush Medical College, Chicago. She was a splendid type of professional womanhood, holding her fine qualities of mind and heart, as it were, in trust as community assets. Her obituary appeared in the JOURNAL-LANCET as of October, 1938.

OSCAR C. DIXON, M.D.

Dr. O. C. Dixon of Adams, North Dakota, was graduated from the University of Michigan in 1904, and was admitted to practice in North Dakota by reciprocity with Michigan in 1919. He practiced for a short time at Fairdale and also at Edmore, North Dakota, before establishing a permanent residence at Adams. He died in a Grafton, North Dakota, hospital in July, 1938, aged 71 years. Dr. Dixon ministered to a large area as a country practitioner, and served his constituency faithfully and well.

EDWARD I. DONOVAN

Dr. Donovan was born in Ontario, a graduate of Queen's University, Kingston, Ontario. He was licensed in North Dakota in 1886, and began practice at Neche, North Dakota, and later moved to Langdon, where he remained the rest of his life. He was a pioneer in spirit, and in addition to his large practice engaged in farming on quite an extensive scale. He died in the Good Samaritan Home, Arthur, North Dakota, October 1938, aged 80 years. Funeral services were from Alphonsis Catholic Church. His was a half century of service unselfishly rendered.

J. M. PHILLIPS, M.D.

Dr. Phillips was born in Wisconsin, June 11, 1868, and died at Cando, North Dakota, June 29, 1938. He graduated from Keokuk Medical College, Iowa, in 1891, and was licensed in North Dakota in 1910. He practiced respectively at Black Creek, Wisconsin, Perth, North Dakota, and Bisbee, North Dakota. Funeral services were conducted in Bisbee Lutheran Church with interment at the same place. He leaves two sons.

MARTIN J. FARDY, M.D.

Dr. M. J. Fardy, a graduate of the University of Washington in 1918 and a licentiate of North Dakota in 1922, died in a Los Angeles hospital, October 27, 1938, aged 45. He practiced at Minot, North Dakota, for a number of years, and while there was honored by his associates by being elected president of the Northwest District Medical Society. He also held the position of chief of staff of St. Joseph's hospital, Minot. He was buried at his old home in Mukwonago, Wisconsin.

FREDERICK V. LYMAN, M.D.

Dr. F. V. Lyman was graduated from the University of Minnesota Medical School in 1903, and was admitted to practice in North Dakota in 1908, from Pembina county. He practiced in Velva, North Dakota, from 1929 until his death, October 29, 1938, aged 59 years. His survivors include Mrs. Lyman, a son and a daughter.

G. J. WARNSHUIS, M.D.

Dr. G. J. Warnshuis was born in Chicago, Illinois, August 6, 1893, and was graduated from Detroit College of Medicine and Surgery in 1916. He located at Marmarth, North Dakota, in 1918, and received his license for North Dakota January 10, 1919. After practicing at Marmarth for several years he moved to Detroit, Michigan, where he established a large practice, and remained until his death in October, 1938.

N. O. DALAGER, M.D.

Dr. N. O. Dalager was born at Austin, Minnesota, and died at Minot, North Dakota, December 27, 1938, aged 60 years. He was graduated from the College of Physicians and Surgeons, Chicago, in 1902. He practiced his profession at Willow City, North Dakota, 1927, 1928, and at Anamoose, North Dakota, 1929 to 1938, inclusive. He was buried in Austin, Minnesota.

CHARLES JOSEPH KING, M.D.

Dr. C. J. King was born November 27, 1879, at Sheldon, Iowa. He was graduated from the University of Iowa and Northwestern University in 1906, and was admitted to North Dakota practice in 1908. He practiced for a time at Dearborn, North Dakota, and later at Columbus, at Wales, and at Langdon, where he died February, 1939, aged 60 years. He leaves a wife and three children. Dr. King was prominent in civic and fraternal organizations and was recognized as a live wire in the communities where he lived and practiced.

JOHN ESLER, M.D.

Dr. J. Esler was born at Blake, Ontario, December 6, 1874, and died at Cereal, Alberta, July 1, 1938. He was graduated from the University of Toronto, Canada, in 1902; was licensed in North Dakota the same year and began practice in Pembina county, where he remained for several years. He then went to western Canada, engaged in farming and again established a medical practice, built a Community Hospital and ministered to a large territory. He was well and favorably known as "The man who never failed in an emergency." The frontier demands the best, and the pioneer hears the call and answers it.

J. HENRY MOELLER, M.D.

Dr. J. H. Moeller was born in Oslo, Norway, September 27, 1865, and died at Maddock, North Dakota, November 23, 1938. He was a graduate of the University of Christiania, receiving the degrees of B.A., M.A. and M.D. from that institution. He was one of four brothers, and they all studied medicine. He came to North Dakota in 1898 and practiced for a year with his brother, Dr. Thor Moeller, of Hillsboro. He then moved to Devils Lake, later to Rugby, and still later to Maddock, where he remained until the time of his death. In addition to being well grounded in his profession he was an appreciative student of music and art. This combination of the practical and cultural favored the formation of a personality that left its trace in the communities he served for so many years. Appreciation of the beautiful is in harmony with the highest ideals of professional life.

ANDREW Y. THOMPSON, M.D.

Dr. A. Y. Thompson was born in Ontario, Canada, and educated in the schools of his native country. He was graduated from Queen's University, Kingston, in 1908. After practicing for some time in Saskatchewan, Canada, he came to North Dakota, received his license in 1914, and settled in

Larimore, where he remained until his death, February 1939, in a Grand Forks hospital. He was for many years physician to Grand Forks County Farm Home at Larimore, and was generally recognized as an efficient guardian of the institution's best interests.

Dr. Thompson was a fine type of the general family physician, capable, honest, honorable, conservative, and every inch a gentleman. With communities served by such as he, "socialiezd medicine" would go a-begging.

JOHN CRAWFORD, M.D.

Dr. John Crawford, 66, of New Rockford, pioneer North Dakota physician, died May 23, 1938. Dr. Crawford was graduated from the University of Ontario in 1894; in 1896 he moved to Moorhead and a year later started practicing in Esmond, North Dakota, where he remained until moving to New Rockford in 1912. He was a past president of the North Dakota State Medical Association.

James Grassick, M.D.

President Long: May I ask the Assembly to rise a moment in deference to those men who have passed. (Assembly stood to pay its respects.)

Committee on Public Health

After reviewing the activities of the year and the problems which have been presented for consideration, your committee recommends the following:

(1) That a careful consideration be given by the medical association of permissive legislation to improve state and local health service, and legislation to improve our vital statistics laws.

(2) That the State Medical Association appoint a committee to make a thorough study of the hospital situation of the state, with a view to preparing legislation for the improvement of the standards in all hospitals.

(3) That the State Medical Association encourage the transfer of the Crippled Children's Services to official medical control, in preference to lay administration as at present in North Dakota.

(4) That the attention of the members of the State Medical Association be called to the fact that the rules and regulations for the control of communicable diseases have been revised as of January 3, 1939, by the State Health Advisory Council.

(5) That the physicians of the state continue their efforts in health education by assuming leadership and supervision over all phases of education related to the practice of medicine, by guiding the activities of the Advisory Health Committees in their respective communities, and by keeping abreast of the developments in modern public health trends.

Respectfully submitted,
Maysil M. Williams, M.D.,
Chairman.

President Long: Editorial Committee of Journal-Lancet. Dr. Arnson? Is no report available from that committee? (No report was made at this time, as this report was taken up at the Council meeting.)

President Long: Dr. French's report.

Secretary Skelsey: Dr. French sent in his report on Medical Education, and states he will be at the meeting later.

Secretary Skelsey read Dr. French's report on Medical Education.

Committee on Medical Education

The members of the Committee on Medical Education have been in frequent contact throughout the year by conference and correspondence.

The plan of the School of Medicine as well as its reasonable success and its difficulties are well known to you.

Because of the lack of clinical facilities the school must perhaps always remain a two year or incomplete school. If it is given adequate support, however, there is no reason why it should not be able to perform a valid service. It limits its admissions in the first year class to about twenty-five; the second year class made up of those that can be promoted usually has a few less. This year the first year class numbers twenty-six, the second year class twenty-one. Its admissions with but very few exceptions are limited to well qualified applicants from the state; the exceptions when they do occur are similarly well qualified students from western states in which there are no medical schools.

The class that finished its curriculum in June, 1938, numbered twenty-four; two of these remained at the school as assistants, but they took the places of two others of earlier classes who had remained in similar capacities, and who wished to resume their regular medical studies at that time; there were then twenty-four to seek admission with advanced standing elsewhere. All but one, the lowest ranking member of the class, were accepted and have been pursuing their clinical work in other schools this year, including one at Harvard, two at Pennsylvania, five at Rush, and six at Northwestern. Of that class several representing all levels in scholarship elected to write on Part I of the National Board. The results were gratifying.

The appropriation for maintenance of the school made at the last session of the legislature was considerably better than that of two years ago. The school is handicapped for want of room, but the support in sight should permit satisfactory strengthening of faculty, library and equipment. The school was inspected two weeks ago by Dr. W. D. Cutter, Secretary of the Council on Medical Education and Hospitals, and by Dr. H. H. Anderson of his staff. No report has as yet been received; the Council will probably meet at St. Louis at the time of the Association meeting.

H. E. French, M.D.
W. C. Fawcett, M.D.
H. D. Benwell, M.D.
H. J. Fortin, M.D.

President Long: Next the Committee on Cancer. Dr. Larson.

Dr. L. W. Larson read the report of the Committee on Cancer.

Committee on Cancer

The activities of your Committee on Cancer have been confined during the past year to two objectives: (1) To follow the policy of former years in which each component society has been urged to devote at least one meeting of the society to a symposium on cancer; (2) To the supervision of the work of the Women's Field Army in North Dakota.

Your committee believes that the House of Delegates and the entire membership of the State Association should be aware of the fact that the Committee on Cancer of the North Dakota State Medical Association acts as the Executive Committee of the North Dakota Women's Field Army. As such, it controls the policies, administration, etc., of the Women's Field Army. For this reason it is logical to conclude that the entire membership of our State Association should wholeheartedly approve the program of the Women's Field Army. However, this has not been universally true, and we believe that it is the duty of every physician in the state to acquaint himself with the objectives of the Women's Field Army, and also lend what assistance he can to the fulfillment of those objectives. This is not a move which savors of State Medicine; and if our members will take the time to acquaint themselves with the organization, they will find that it can only do our profession good, in addition to helping cancer victims.

Respectfully submitted,
L. W. Larson, M.D.,
Chairman.

Dr. Frank Darrow: Mr. President, you might be interested. The Cass County Society had this matter brought up to the local chairman of this woman's society and called me up about it. She had already arranged a meeting of people who were interested in hearing something about cancer. So I gave the talk at this meeting, but we brought the question up at the Cass County Society, and these points were brought out: That Cancer Prevention matter is the one disease that the medical profession itself has sponsored. And anything that's done along that line we will get credit for, and it's not like the tuberculosis situation which was sponsored by the laity nor the venereal disease problem which has been sponsored by the United States Public Health Department. The cancer control is sponsored by the doctors and started by the doctors. I think we should coöperate in this thing, so a committee was appointed by the Cass County Society to work in connection with women's

organizations, and it mainly consists in the fact that they will appoint speakers for anything that these women may have. It would be, I think, very much in line if every society would do a similar thing. With Dr. Larson's permission, I would like to add that to the report.

Dr. LARSON: I think I'll accept that as a supplement of the report. I'm glad to hear that your society has taken that action. Unfortunately, there are many men in the state who do not understand what this is all about, and too many of our members make snap decisions on these affairs, and the ladies just can't understand why an organization that's supposed to be controlled by doctors should not have the wholehearted cooperation of all the members of the profession.

Dr. FRANK DARROW: Friends wanted this in this state—the organization was perfected, and the woman who was put in charge of the county had arranged for some meetings, but she found it impossible to obtain any doctor who was willing to speak on the subject of cancer. Now I think that's a deplorable situation. Out in our own country, we appear before twenty different organizations—made up of clubs to the Salvation Army. The ladies' aid society had a meeting devoted to cancer. You'd be surprised the amount of interest these women have shown in the subject of cancer. And it can't do anything but good for the profession. I think the things I brought up will obviate this difficulty—just a question of getting somebody to speak at these meetings. The usual procedure is to ask anybody who is willing to make a talk of this kind. And of course, in our innate modesty—nobody steps up; but if a committee is appointed to have charge of this, and they appoint the speaker, our society is unanimous in saying that nobody would turn down the speaking at any of these meetings at which they were asked to speak, providing it was at all possible for them to do so. And I think where that is left to a committee, and the men are appointed, you will have no trouble in getting speakers; on the other hand, if you leave it to a voluntary proposition, you won't get any speakers.

President LONG: I think it would be best to come from the societies through the committee in the way of a letter, perhaps, to the component societies on the part of the central committee.

Dr. FRANK DARROW: Another thing, in connection with this, I think the smaller the meeting, the better the results. At least, that's been our experience here. You don't find out what they don't know about cancer, until you get them in a small meeting where they're willing to speak up and ask questions. You take a large public gathering, and I don't think they're worth very much; but in a very small meeting, I think they get a lot out of it, and we gradually find out what the public doesn't know about cancer . . . and that's, of course, what we want to tell them.

Committee on Tuberculosis

(No report made at this session.)

President LONG: The next — the Committee on Fractures. Dr. Campbell.

Dr. CAMPBELL: We plan to meet in a group.

(This report, which was read later, is included here.)

Committee on Fractures

Your Committee on Fractures met at the Gardner Hotel, Fargo, and discussed various phases of the fracture problem.

We are of the unanimous opinion that there has been a marked improvement in the treatment of fractures in the last years. Most hospitals of 50 beds or over carry the minimum requirements for the treatment of fractures, including Thomas splints, bandages, beds, and frames, plaster, wire, etc.

A great number of the accidents which we are called upon to treat are from automobile wrecks on the road, and as a rule the injured person is picked up by a passing motorist, who with the very best of intentions, by rough or bad handling of the case, does additional harm to the already damaged structures and thereby makes a bad condition worse; especially is this true with regard to back injuries, dislocations or fracture of the vertebrae. Ignorant handling of a case of fracture of the spine may result in complete paralysis and a hopeless condition.

We feel that it is important to have the lay public fully instructed in the handling of back injury; it is better to leave the patient lie where he is, and await the arrival of an ambulance, than to be doubled up in the back seat of a passing automobile.

The committee is of the opinion that all injuries where there is any possible suspicion of a bone injury, should be X-rayed; and in the case of a fracture, that re-raying after reduction is adivsable to minimize responsibility of the doctor.

Refusal of the patient for an X-ray in a suspicious case of fracture relieves the physician of a good deal of the responsibility of the after-results if a fracture were present.

That the phrase "splint them as they lie," should be further emphasized not only with the doctors, but with the laity who might accidentally come in contact with the accident before the doctor; emphasizing that the patient should not be moved before the doctor arrives, where possible.

The question of when to advise lamenectomy was discussed, and the committee was of the opinion that a patient with progressive paralysis and a positive Quackenstadt was a proper subject for lamenectomy; but that if the paralysis was complete immediately after injury, that it was not indicated.

The method of treatment in fractures of the femur, particularly with respect to the very aged, was discussed. We are of the opinion that the last word regarding treatment in these cases has not been said owing to the fact that cases of aseptic necrosis of the head of the femur have occurred two and three years after mechanical fixation with pins, etc. That the real Whitman treatment gave very excellent results, and in cases of impacted fracture, that even immobilization with sand bags was often times preferable to the use of mechanical appliances.

The use of the Thomas Hip Splint with traction also gave very good results in certain cases.

As regards Colles' fracture, a thorough reduction with checking on the proper angle of the wrist joint was the important point, followed by the use of a posterior mould or a sugar tong splint.

R. D. CAMPBELL, M.D., *Chairman*, Grand Forks.
A. L. CAMERON, M.D., Minot.
J. C. FAWCETT, M.D., Devils Lake.
PAUL H. BURTON, M.D., Fargo.
M. W. ROAN, M.D., Bismarck.
W. W. WOOD, M.D., Jamestown.
A. P. NACHTWEY, M.D., Dickinson.
A. F. HAMMARGREN, M.D., Harvey.
H. J. FORTIN, M.D., Fargo.

President LONG: Committee on Medical Economics. Dr. Brandes.

Dr. H. A. Brandes read the report of the committee on economic problems.

Committee on Medical Economics

The Committee on Medical Economics submits the following report on its activities during the past year:

American Medical Association Survery. We regret to report that the work assigned to this Committee by the House of Delegates at the last annual meeting to prepare a report on Medical Care and Supply in our state for the American Medical Association was not carried out because the information which was to have been sent to us by the component societies did not come into our hands. We understand there was no response to the several requests sent out by the Secretary of the State Association to the officers of component organizations for the material which was to have been gathered and forwarded to us for compilation.

Medical Relief Program Under County Welfare Boards. Owing to the financial condition of the state and the various counties, funds are becoming more inadequate to pay the cost of relief. As a result a number of County Welfare Boards, in an effort to pay their medical bills with the limited funds allotted to them by the county and state, have attempted to set up new fee schedules or have undertaken to pro-rate physicians' bills. In many counties we have the situation where Welfare Boards contract for medical service far beyond their ability to pay.

These matters have been brought to the attention of the State Public Welfare Board.

Unless more funds are made available or the demands for relief are materially reduced, we can expect no improvement under the present conditions.

In reference to the changes made in fee schedules by County Welfare Boards, we are informed that the acceptance of our fee schedule by the State Public Welfare Board does not make it mandatory upon the various county boards to adopt our fees for relief work. Under the Act creating the State Public Welfare Board, the local boards have the authority to adopt their own schedule or to substitute a contract program for the family physician plan. It seems to the Committee that under these conditions problems with County Welfare Boards should be handled locally by a committee from the county or district societies. However, if the local committee wishes assistance from the State Committee we stand ready and willing to assist.

Medical Relief Program for F. S. A. Clients. One of the chief objections to the programs for medical care under the F. S. A. during the past three years has been the lack of continuity. With each change there has been a delay of several months before the new plan could be put into operation. This has resulted in confusion in the administration of programs, with considerable loss to the profession.

Our previous agreement with the Farm Security Administration, which was to have expired June 30, 1938, but was extended to October 31, 1938, was unsatisfactory because of the reduction in the payment of our bills. You will recall at the last meeting the House of Delegates passed a resolution which objected to the pro-ration of our bills, and requested additional funds. After a delay of two months we succeeded in obtaining more money, and our bills for September and October were paid in full.

Negotiations for a new program were delayed by the F. S. A. until the latter part of August 1938 and one month later we were requested to consider a renewal of the 1937-38 program. The Committee objected to the continuance of the plan with its prorata clause because of our recent experiences. It was not until the F. S. A. promised to eliminate the two factors which we believed chiefly responsible for the reduction in payment of our bills that we recommended to the Executive Committee renewal of the previous program. The two factors which we thought accounted for pro-rating were: (1) administrative delay in the certification of the clients to the FMAC, and, (2) collection of dues on a monthly and quarterly basis. We believed that the membership dues of $2.00 per month per family ($1.01 of this amount for physicians) on a nine months basis would provide sufficient funds, because statistics gathered under the Resettlement Administration (1936 to 1937) and under the F.S.A. (1937 to 1938) disclosed that the cost per family per month for physician's service ranged from 93 cents to $1.02.

With the depletion of state relief funds last fall, we felt it was imperative to secure federal funds. This factor, more than any other, was responsible for our recommendation to the State Medical Association.

With the renewal of the program on November 1, 1938, the demands for medical care became unreasonable and excessive. The cost of physicians' services rose from .927 cents per family in October to $1.57 in November; $2.11 in December; $2.20 in January, and $1.46 in February.

We believe the health insurance feature in the present plan is in a large measure responsible for the breakdown in the program. Other factors, such as lowering of the requirements for eligibility to membership in the Corporation; high pressure salesmanship in securing new members; the lack of understanding on the part of the clients as to the type of medical care allowed under the program; and, the change in procedure for authorization for medical service, all contributed to the unsatisfactory operation of the plan.

Early in December we realized the program was not operating satisfactorily and we at once requested the F. S. A. for additional funds and a conference at an early date.

On February 5, 1939, representatives from the State Medical Association, State Dental Association, State Pharmaceutical Association, and State Hospital Association met with F. S. A. officials in Bismarck and out of this conference a resolution was drafted requesting the F. S. A. for supplemental funds and a change in the monthly allotment to cover the additional costs of the increased sick load during the winter and spring months. To date the request for additional funds has not been granted.

Your Committee, failing to get favorable action on the request of February 5, 1939, asked F. S. A. officials for a second conference and we met with them in Bismarck three days ago (May 5, 1939). After a lengthy discussion, the Committee submitted the following recommendation for a new plan to furnish medical care to emergency grant clients:

A. That the insurance plan be eliminated and the program be placed on a direct relief basis;

B. That allotment of funds from the F. S. A. to the FMAC be on a basis of a minimum of $36.00 per year per family;

C. That the fee schedule remain the same as in the previous program;

D. And, that we agree to make a sincere effort to correct any irregularities on the part of physicians participating in the program.

The proposal was submitted with the understanding that if acceptable to the F.S.A. it would not be binding until the State Medical Association had approved the action of this Committee.

We do not believe it is possible to obtain the approval of the F. S. A. to any medical relief program unless we agree in advance on a definite amount to be spent for medical service. With this in mind, we would suggest to this body that if it rejects a state-wide program because with a prorating clause, that the State Medical Association allow local or district societies in need of assistance from the Federal Government the privilege of entering into negotiations with the F. S. A. Physicians can expect no assistance from the counties or the state in the care of F. S. A. clients.

It is regrettable that your Committee did not recognize the inherent dangers in the present set-up, which have been partly responsible for the financial losses you have taken during the past year. We are quite sure that had we rejected the renewal of the previous program your losses would have been much greater.

Again we must remind you that because of depleted funds it is out of the question to expect help from county and state relief agencies. Therefore, we must continue our negotiations with the Federal Government if we are to keep our physicians in the smaller communities and our hospital doors open.

Our experiences of the past three years have proven beyond a question of doubt that any health insurance program for relief clients is unworkable and doomed to failure. We believe, too, that the unsatisfactory operation of our present set-up under the F. S. A. has awakened our people, especially the farm population, to the evils of State or Socialized Medicine.

H. A. BRANDES, M.D.
Chairman.

Remarks by Dr. H. A. Brandes, Chairman of the Committee on Medical Economics:

It may be of interest to the members of the House of Delegates to learn that the cost of medical care to the clients of our county welfare boards is approximately eighteen dollars and eighty-one cents ($18.81) per family per annum. This figure is based on a report issued by the Public Welfare Board for the fiscal year July 1, 1937, to July 1, 1938. This is approximately six dollars less than the amount allotted to us by the Farm Security Administration. There are several reasons for the lower cost under the county welfare boards. There are a small number of counties employing county physicians, and others have modifications of our medical relief fee schedule. Another factor which keeps down the cost of medical care under the public welfare boards is that the client must present himself before the Executive Secretary for authorization for medical treatment.

I want to take this opportunity to thank the members of my committee and the officers of the state medical association for the fine spirit of coöperation given me during the past year, and for the six years I have served as Chairman of the Committee on Medical Economics.

Dr. LARSON: Mr. President, is this open for discussion?

President LONG: No. This will go to the Reference Committee and then come up for discussion later. The next is Dr. Moore's report on Child Welfare.

Dr. John H. Moore read the report of the Committee on Child Welfare.

Committee on Maternal and Child Welfare

Your Committee on Maternal and Child Welfare has been occupied during 1938 with three major objectives. The first of these was a continuation of the Educational Program for the Physicians in North Dakota. A sub-committee consisting of Dr. Ralph E. Pray of Fargo and Dr. J. L. Conrad of Jamestown were given the responsibility for arranging for the postgraduate courses in obstetrics and pediatrics, and they secured as clinicians, Dr. William F. Mengert, Associate Professor of Obstetrics and Gynecology at the University of Iowa, and Dr. W. H. Thompson, Assistant Professor of Pediatrics at the University of Minnesota, to give the courses for 1938. You are familiar with the plan as carried out last year and in the five cities in which these courses were held, total registration was 287. This large representation indicated the interest which North Dakota physicians had in this type of postgraduate education. Following the completion of this course the same sub-committee sent a questionnaire to the physicians enrolled, asking them for further suggestions regarding subsequent courses. The response to the questionnaire was very gratifying and the sub-committee reported that the majority of physicians favored a continuation of this plan another year and that October was overwhelmingly favored as the month in which to hold the courses. At the conclusion of the course the booklet, *Maternal Care,* approved by the American Committee on Maternal, Incorporated, and edited by Dr. F. L. Adair was sent to physicians of the state by the State Department of Health, following the recommendation and endorsement of your Committee.

At its final meeting of the year held in Grand Forks on December 17th, 1938, the entire personnel of the Committee was in attendance and at this time the sub-committee on the Educational Program for Physicians was instructed to enlarge its work for 1939, and Dr. Pray and Dr. Conrad were continued as this sub-committee.

One phase of the Educational Program for Physicians for 1939 has just been completed. I refer to the ten physicians of North Dakota who have been in attendance at the postgraduate course in obstetrics given at the Center for Continuation Study at the University of Minnesota May 1st to 6th, 1939, inclusive. Plans for this educational work were laid at the Grand Forks meeting of the Committee and the Committee requested that Dr. Maysil M. Williams make available funds for this unique type of postgraduate education. This was done. The ten men who were selected to attend this course were selected by the representative district medical societies. The reports which the physicians in attendance at this course bring back to their respective societies will play a large part in determining whether or not this new phase of postgraduate education should be continued.

The second major objective of the Committee for 1938 was an individual analysis of all maternal deaths occurring in North Dakota. The Committee requested the State Department of Health to make this survey for the years 1937 and 1938. At the scientific sessions of the State Association this year, this material* will be presented as part of the scientific program.

The third and final objective of the Committee for 1938 was the launching of a program designed to reduce the incidence of premature and newborn mortality in North Dakota. The Committee has adopted the following program:

(1) The establishment of recognized methods of management and feeding of the premature infant as standard in all North Dakota hospitals.

(2) The purchase and distribution of low-cost incubators to North Dakota hospitals and the eventual placement of incubators in other key spots in the State where hospital facilities are widely spaced.

(3) The adoption of a modern, recognized technic of resuscitation of premature and newborn infants as standard in all North Dakota hospitals.

(4) The establishment of a standard summary record form, such as that designed by Dr. Russell J. Moe of Duluth, Minnesota, in all North Dakota hospitals so that statistical data can readily be collected for case studies.

(5) An educational program of Seminars to be conducted by pediatrists selected by the Committee.

(6) Obtain statistical data on the causes of neonatal deaths in North Dakota both in hospitals and in home deliveries.

(7) Publish a preliminary report of this program as information becomes available and additional reports from time to time as conditions warrant.

Dr. Pray is at the present time engaged in completing the series of Seminars referred to in this program.

Through the coöperation of the University of North Dakota, the University's shop facilities were made available to the Committee for the manufacture of low-cost infant incubators, and at the present time sixteen of these low-cost units are now in use in hospitals throughout this State and additional orders are still being received for them. The Committee wishes to express its sincere thanks to the University for its splendid cooperation in making these units available.

Your Committee feels that the objectives outlined have the support of the physicians of North Dakota. We hope to make more effective the all-important patient-private physician relationship, the backbone of medical practice in general and most particularly in the field of obstetrics and pediatrics and to further this end we respectfully request your suggestions and your continued coöperation.

**Maternal Mortality in North Dakota,* John H. Moore, M.D., F.A.C.S., Chairman North Dakota Committee on Maternal and Child Welfare.

Dr. Frank Darrow read the report of the Committee on Venereal Disease.

Committee on Venereal Diseases

Early in the year a meeting was held at Bismarck in collaboration with the State Department of Health. It was decided to make a survey of medical opinion on Venereal Disease. The following questionnaire was submitted to every licensed physician in the State: (* * * * *)

The response was very gratifying, and the analysis of answers is being made by the State Department of Health. One of the results directly traceable to this survey was the passage of a law by the Legislature making it compulsory for all candidates for marriage to have a serological test for syphilis before being granted a marriage license. A copy of this law is attached to this report.

This Spring the State Department of Health submitted a syphilis control plan. This plan was submitted to the various members of the committee, and while there was some minor criticism, it was approved as we had nothing better to offer. The doctors of the State have received a letter describing this plan together with the various forms to be used, which are added as a part of this report.

In brief it provides for a fee of 50c for each patient activity report per week received from the physician. The object of this plan is to make for better reporting and in particular to control the follow-up of cases. The Department of Health has made no formal report as yet that we are aware of to indicate whether or not there has been any improvement in Venereal Disease control; however, we have had some encouraging verbal reports.

Numerous talks to the laity on syphilis have been given throughout the State, both at local gatherings and over the radio. Perhaps the most significant development since this whole nation-wide Venereal Disease campaign has been conducted is the noticeable fact that Venereal Disease can be discussed under the same kind of conditions as any other subject of public interest.

FRANK I. DARROW, M.D., *Chairman,* Fargo.
M. J. FARDY, M.D., Minot.*
L. W. LARSON, M.D., Bismarck.
H. D. BENWELL, M.D., Grand Forks.
G. W. TOOMY, M.D., Devils Lake.
D. J. HALLIDAY, M.D., Kenmare.
WILL H. MOORE, M.D., Valley City.
M. M. HEFFRON, M.D., Devils Lake.
T. L. DE PUY, M.D., Jamestown.

**Deceased.*

President LONG: We will have Dr. Skelsey's report of the Radio Committee.

Committee on Radio

Based on instructions set forth by the House of Delegates at the last annual meeting, your Committee entered into correspondence with those local medical societies having access to radio stations. In substance, we wrote as follows:

(1) That, upon request, the Committee would furnish them with approved material for radio transmission;

(2) That such material would preferably be that produced by the American Medical Association's Bureau of Education and Public Health. Such lists to be supplied by the Committee would indicate many varied topics by the Chicago headquarters, for five, ten and fifteen minutes' talk;

(3) That all material the Committee furnished would be *gratis* to the local societies;

(4) That no financial expense against the State Medical Association should be incurred by the local societies;

(5) That in the event any of the societies desired to utilize material prepared by the societies themselves, then such contribution must first have the approval of the Committee before its transmission over the air;

(6) That no individual name be publicized by the society. That there must be used only the name of the local society and that of the State Medical Association.

This last-quoted ruling has *not* met with total approval; while now some seem to consider from experience that it is quite proper.

Your Committee has requested definite replies as to how the plan has developed, i. e., the response of the public, as far as can be ascertained; the question of suitable hours; how the majority of the members of the societies look upon the plan. Only a few responses received to date (May 4). One large society (Northwest) decided as of date April 27th, 1939, that they would not participate. Another large society (Cass) are favorable, and state they will continue the work until this fall.

Taking it for granted that the delegates will be duly instructed, your Committee would request from the House at these sessions, some decision in this affair of medical publicity *via* the radio.

Respectfully submitted,
A. W. SKELSEY, M.D., Chairman.
C. E. STACKHOUSE, M.D.
W. A. LIEBELER, M.D.

President LONG: It's just 12 o'clock and we still have some committees to report, but I think that rather than get overtired we better adjourn now until 2 o'clock. I'd like to appoint the Nominating Committee at this time: Drs. W. C. Fawcett, J. W. Bowen, O. T. Benson.

(The First Session of the House of Delegates of the North Dakota State Medical Association was adjourned by President Long at 12 noon.)

SECOND MEETING
of the
HOUSE OF DELEGATES

The second session of the House of Delegates was called to order by the President, Dr. W. H. Long, at 2:05 P. M. Monday, May 8, 1939, in the Reading Room of the Hotel Gardner, Fargo, North Dakota.

Secretary Skelsey called the roll, and the following doctors were present:

Doctors:
W. H. Long, Fargo
A. W. Skelsey, Fargo
G. F. Drew, Devils Lake
N. O. Ramstad, Bismarck
P. G. Arzt, Jamestown
F. W. Fergusson, Kulm
Charles MacLachlan, New Rockford
A. E. Spear, Dickinson
H J. Fortin, Fargo
Frank I. Darrow, Fargo
J. B. James, Page
H. J. Mattson, McVille
W. A. Liebeler, Grand Forks
O. T. Benson, Glen Ullin
R. H. Waldschmidt, Bismarck
C. C. Smith, Mandan
A. P. Nachtwey, Dickinson
L. J. Seibel, Harvey
W. K. Cuthbert, Hillsboro
H. B. Huntley, Kindred
A. M. Thompson
A. W. Macdonald, Valley City.

Dr. H. J. Fortin read the report of the Committee on Crippled Children.

Committee on Crippled Children

At our last state meeting, there was considerable discussion of the Federal Government's program for the care of crippled children. This program requires that orthopedic and corrective work be done by orthopedic surgeons who are members of the American Board of Orthopedics. It also requires that this work be done in hospitals where adequate follow-up treatments can be given by trained physiotherapists who have the necessary physiotherapy equipment.

However, it is felt by many surgeons of the state that much of this work can be done by the general surgeon located in the territory wherein the case arises. This plan would also entail less expense to the government in the transportation of cases and accompanying relatives from more distant points.

This committee met with Miss Theodora Allen, State Director, in Minot, last June. It was proposed that she take up with the Department at Washington the feasibility of permitting some of this work be done by surgeons who are members of the American College of Surgery. This she agreed to do, and did do. The net result was that we were informed that the Department would not relax any of its regulations, and that the work must be carried on as before. It was pointed out that should the Department open up the field, it would not have adequate control over the selection of the operating surgeon, and that proper value might not be received for the money expended.

A. R. SORENSON, M.D., Chairman.
H. J. FORTIN, M.D.
J. C. SWANSON, M.D.
W. W. WOOD, M.D.
R. H. WALDSCHMIDT, M.D.

Dr. FORTIN, of Fargo: In the last year, the practice of this department has been to let the general surgeons around the State do more and more of this work which they should do, and with which they have had experience.

Temporary Committee on Constitution and By-Laws

Dr. W. C. Fawcett, Chairman, presented the proposed document in detail, and asked for suggestions. Considerable time was given to consideration of the various sections; but lack of space in these printed Transactions precludes detailed reporting thereof. The President then appointed, at the request of Chairman Fawcett, several additional men to coöperate with the Committee, in discussing the suggestions brought out in this session; such enlarged Committee to report at the next meeting of the House this day.

At the ensuing session, the consideration of the proposed Constitution and By-Laws was debated for some time, after which it was decided: (a) that the Temporary Committee should be continued for the next twelve months; (b) that the Committee would whip into shape the suggestions brought out in this meeting; (c) that the tentative document would be turned over to the State Secretary, in order that (d) he procure copies thereof, for distribution, in due time, to the councillors and to the secretaries of the thirteen local and district medical societies; (e) that said secretaries shall have read to their membership such document; (f) to be prepared for its consideration and probably its adoption at our next annual meeting.

Place of Next Annual Meeting

Dr. A. D. MCCANNEL, of Minot: I am very glad to extend an invitation for this Society to meet with us next year in Minot.

President LONG: We have this invitation from Minot. Are there any others? Motion made, seconded, and duly carried.

Dr. P. G. ARZT, of Jamestown: Mr. Chairman, I may be out of order, but I want now to place an invitation for the Association to meet with us at Jamestown in 1942.

RESOLUTIONS

The first to be presented was by Dr. R. H. Waldschmidt of Bismarck.

Dr. WALDSCHMIDT: Mr. President, we have passed this *Resolution in the Sixth District Medical Society April 19, 1939:*

WHEREAS: The financial demands placed upon the North Dakota State Medical Association are continually increasing, it is the desire of the Sixth District Medical Society to make the following suggestion to the House of Delegates of the North Dakota State Medical Association:

WE RECOMMEND: That the annual dues to the North Dakota State Medical Association be increased from $5.00 to $10.00 in order to have sufficient funds to take care of its necessary financial obligations.

There is another resolution which we passed, same date:

WHEREAS: The operation of the F. M. A. C. has been unsatisfactory for so many reasons, it is the desire of the Sixth District Medical Society to make the following suggestions to the State Medical Economics Committee and to the House of Delegates of the State Association in order that they may be advised as to the reactions of the membership of our Society:

(1) We are unalterably opposed to the F. M. A. C. arrangement of remuneration for medical services, both for doctors and hospital services. It is our opinion that no agreement should be made with the F. M. A. C. which allows any proration of the fee payable. It is our desire that the F. M. A. C. must guarantee the basic fees under which the original agreement was made.

(2) It is also our opinion that the recipients of medical service should be referred to their physicians through the Welfare Board after an investigation has been made to determine the eligibility for medical service on a reduced fee basis. In other words, we are opposed to the plan now in existence—the issuing of cards to the families which can be presented to any physician at any time. This attitude is taken because many of the patrons of the F. M. A. C. have abused the privileges which entitle them to emergency medical care. We believe the elimination of the card system will remove one of the abuses which has placed the plan in jeopardy.

(3) We believe that the amount of money which has been set aside for medical care in North Dakota is insufficient. It is our opinion that the suggested $2.75 a month per family, or $31.27 on an annual basis, plus $1.73 per family per year for administration expense is insufficient to care for the emergency care as our recent experience has well shown.

WE RECOMMEND: To the House of Delegates of the Medical Association that some arrangement should be made for the continuance of Federal aid for medical and hospital service in North Dakota, inasmuch as the elimination of Federal aid or of such plan as the F. M. A. C. would be a tragedy and a hardship not only to the population, but also to the profession, particularly those men located in the rural areas which have suffered unduly from crop failures.

There is another resolution which was passed, same date:

WHEREAS: The operation of the Crippled Children's Program has been unsatisfactory to the majority of the physicians and surgeons of the State of North Dakota and unfair to the majority of the approved hospitals throughout the State, it is the desire of the Sixth District Medical Society to make the following suggestions to the House of Delegates of the North Dakota State Medical Association in order that they may be advised as to the reactions of the membership of our Society:

(1) We are opposed to the present method of operation of the Crippled Children's Program because of the unfair distribution of the work in that only a very few surgeons have been permitted to take care of these children.

(2) It is our opinion that the members of the American College of Surgeons, American Board of Surgery, Western Surgical Association, and other boards of special branches of surgery are capable of performing the necessary procedures in the care of these patients.

(3) We also recommend that the Crippled Children's Program be administered by a graduate of a reputable medical school and licensed to practice in the State of North Dakota. We, therefore, recommend that the state service for crippled children be administered by the official state health agency.

R. H. WALDSCHMIDT, M.D.
C. C. SMITH, M.D.
O. T. BENSON, M.D.

Resolution from Traill-Steele Society

Dr. CUTHBERT: At a meeting of the Traill-Steele District Medical Society held on April 25, 1939, the following motion was unanimously adopted:

"RESOLVED: That we favor a change in the agreement with the Farmers Mutual Aid Corporation so that a certain fixed fee (without deductions of any kind) be paid for services rendered, and that this modified agreement be entered into by the State Medical Association, and not by the individual District Societies."

That's the point that we discussed quite freely there, and we were unanimously of the opinion that whatever is worked out should be worked out by the state association and not by the different districts. You recognize the fact that if we start working district against district, organizers will try to beat one district down, and then they use it as a prop to go over to the next district, and chisel there. And from there they can chisel on the others. Last week we had a representative here from outside of the district and outside of the county; now it's a matter for the commissioner of the Welare Board trying to make a dicker for contract work to do the work in our county, and that didn't set very good with the fellows.

President LONG: Any other new business?

Dr. FRANK DARROW: I have another "amen" to add to this already growing bunch of resolutions on the F. M. A. C. I received the following letter from our Society. "Your committee appointed to bring recommendations for the Cass County Medical Society relative to the F. M. A. C. set-up, which expires June 30th, after due deliberation recommend: That cards be limited to emergency grant clients; that the pro-rating clause be eliminated; that eligibility to cards be attested to the Welfare Board; that the cards, when issued entitle holder to necessary medical services." The above was acted upon at the meeting on April 24th, and it was moved and carried that you, as a delegate to the state meeting, be instructed to follow these instructions when you meet with the House of Delegates on May 8, 9 and 10.

(The following resolution was made by Dr. W. A. Liebeler of Grand Forks at the Third Session of the House of Delegates, but included here.)

Dr. LIEBELER: Realizing the complexity that has been, and is forthcoming, of the various committees of the North Dakota State Medical Association, and taking peculiar note of the time and energy expended by various committees, and that this load has been more than should have been expected of any member of this Society, and especially of the State Secretary who has acted in that capacity far beyond his present remuneration; that a good deal of the responsibility of the chairmen of the various committees can be lessened; that the component societies and the members of the societies can be more adequately informd; that a more business-like program can be administered; and that the entire consensus of the State Medical Association can be more concretely centralized, by a change in the present set-up of the Secretary of the State Medical Association. Be it, therefore, resolved that a full-time Secretary of the State Medical Association be obtaind ate a sum not to exceed two hundred dollars ($200.00) per month, and that the selection of a State Secretary to fulfill the responsibilities of that office be obtained by the Councillors of the State Association. (Moved, seconded and carried.)

President LONG: Any other new business? Resolutions? If not, they will soon go to the reference committee.

Dr. WALDSCHMIDT: Mr. President.

President LONG: Dr. Waldschmidt.

Dr. WALDSCHMIDT: Are we still operating under this Constitution?

President LONG: Yes.

Dr. WALDSCHMIDT: Well, then, we'll have to move if we're going to adopt that $10.00 for the coming year. We'll have to make a motion to amend the By-Laws, Chapter 9, Assessments and Expenditures, Section I, which reads as follows: "The assessment of $5.00 — instead of $5.00 there, put $10.00 — per capita on the membership of the component societies unless otherwise ordered, is hereby made the annual dues of this Association." I understand that this particular motion here has to lay over one day according to the Constitution. It can't be taken up until tomorrow.

President LONG: To the evening session tonight which corresponds to the third meeting.

Dr. WALDSCHMIDT: Well, I'd like to make that a motion that the assessment be changed from $5.00 to $10.00 and the other just the same.

President LONG: Recommend it to the Committee. Second?

DELEGATE: Second.

President LONG: All in favor.

All: "Aye". (Carried.)

Some suggestions regarding experiences had in the medical care of persons in the drought areas, based on understandings had with the F. M. A. C. and the F. S. A. the past few years, with complications arising therefrom. Space here does not permit of complete reporting, but the gist of the various talks will be given below. Reference to the annual report of the Committee on Medical Economics and to the annual report of the State Secretary supplement this section of the Transactions.

President LONG: * * * * I believe that resolutions coming from some of the local and district medical societies contain one clause impossible at this time, namely: that the prorating clause in our "understanding" with the federal authorities must be eliminated. When one goes to ask funds from any governmental agency, that person or organization must ask for a certain amount, for a definite purpose; that is the way and the only way such governmental appropriation can be secured, if at all. We must judge from our past experience how much we should request, in the hope that the amount solicited will be high enough to avoid prorating. If we use in ten months the total amount alloted, then we will have to work two months without pay, because when once a definite amount has been appropriated, it would be very hard to get additional funds to supplement the original. I am certain we can be sure of the sincerity of the people, of the authorities, who have interceded for us. If we could get the basic assessment placed at $3.00 monthly, well and good; but I believe that it would be impossible to flatly eliminate the prorating clause.

Dr. FRANK DARROW, of Fargo: Spoke in regard to the problem of surplus funds remaining any one month,—could such funds be used for a possible shortage the next month? Refers to the trouble the physicians have been having in this respect, and which may be expected to continue under renewed contracts, if the prorating feature not eliminated. Believes, however, that the majority of the delegates attending this meeting have come with the firm idea of no prorating whatever.

Dr. CUTHBERT, of Hillsboro: Cited some very striking proofs of the inadequacies of the present system with the federal-state authorities. Complains that much of this insurance feature was "sold" under high pressure methods, at the expense and to the embarrassment of the doctors. Also raised the often asked inquiry as to what constitutes an "emergency?"

Dr. A. D. MCCANNEL, of Minot: As a member of the Committee on Medical Economics and from his past experience as member of the State Welfare Board, discussed these problems. In dealing with governmental agencies, all the Medical Association can do is to present its proposition, and to hope for the best. We did not go blindly into this present plan, because we had a former yard stick by which to estimate the possibility of the plan working out satisfactorily; but of late conditions have changed, due probably in part to the high pressure salesmanship of the authorities in selling the cards, and also due partly to the greatly increased demands of the clients. Add to this the prorating feature gives us the complications deplored by both the practitioners and the authorities. As regards the federal authorities coming in and furnishing funds for North Dakota, calls attention to the fact that twenty-three counties in this State cannot levy enough,—let alone collect enough,—to run their ordinary expenses, to say nothing of affording relief. Had it not been for these contributions from the federal government, we probably would have had many less doctors in at least the Western part of the State. Believes that much as we may dislike it, we must realize the fact that we have to depend on outside relief money coming into North Dakota, if we are going to take care of medical needs. Suggests that for the extra heavy loads of certain months, the federal aid be proportioned above that of the lesser months. Lastly, our connections with the authorities should be statewide; not merely that several local or district medical societies have separate arrangements with the authorities.

Dr. O. T. BENSON, of Glen Ullin: Compliments our Committee on Medical Economics, and considers that such Committee knows the "answer" much better than some of the physicians.

Dr. L. J. SEIBEL, of Harvey: Expresses his pleasure that his Society (Tri-County) left to the state annual meeting the solution of this problem. Tri-County realizes the difficulties encountered by many of the physicians in the State. As recipients of a gift, we cannot make too strong demands.

Dr. HUNTLEY, of Kindred: Discussed the so-called heavy load months; believes that if additional funds could be secured for same, the plan might eliminate the prorating feature.

Dr. G. F. DREW, of Devils Lake: Considers that in these problems we should place the governmental agencies in a more favorable light. We should realize the fact that these people in North Dakota who have nothing, and who are allegedly starving, are not actually the "wards" of Washington, D. C., although it is claimed that they are. We should realize that the United States Government has diverted millions of dollars into this State in the past ten years, so that really North Dakota is a dependency upon the national government. We should appreciate what Washington does for us, and we should do the best we can under these circumstances. The Government makes mistakes, and so do we. If the Government is willing to change its machinery in this matter of cards for clients, we should try to coöperate. As regards that word "emergency", it really doesn't mean so much; and the best thing to do is to get rid of that word. The card patrons should be thoroughly investigated. There always will be poor pay in the practice of medicine, but if we can eliminate the "poor pay" back to where it was about ten years ago, that is about all we can expect.

(Second meeting of the House of Delegates adjourned at 3:18 P. M., May 8, 1939.)

THIRD MEETING
HOUSE OF DELEGATES

The third session of the House of Delegates was called to order by the President, Dr. W. H. Long, at 8:20 P. M., Monday, May 8, 1939, in the Reading Room of the Hotel Gardner, Fargo, North Dakota.

At the suggestion of President Long, Secretary Skelsey called the roll, and the following officers, councillors, delegates and alternates responded.

Doctors:

W. H. Long, Fargo
A. W. Skelsey, Fargo
M. MacGregor, Fargo
A. R. Sorenson, Minot
N. O. Ramstad, Bismarck
P. G. Arzt, Jamestown
F. W. Fergusson, Kulm
Charles MacLachlan, New Rockford
A. E. Spear, Dickinson
H. J. Fortin, Fargo
Frank I. Darrow, Fargo
H. J. Mattson, McVille
W. A. Liebeler, Grand Forks
O. T. Benson, Glen Ullin
R. H. Waldschmidt, Bismarck
C. C. Smith, Mandan
G. B. Ribble, LaMoure
A. P. Nachtwey, Dickinson

L. J. Seibel, Harvey
H. B. Huntley, Kindred
P. H. Woutat, Grand Forks
W. A. Wright, Williston
O. Haraldson, Minot.

The President declared a quorum present and the House duly constituted for the transaction of business.

Dr. WILLIAMS: I would like to be allowed to write a short summary of some of the Public Health Activities as we have had in other years, to be included in your report to the JOURNAL-LANCET as we did last year; is that all right?

Report of the Nominating Committee

Dr. J. M. Bowen of Dickinson, in behalf of the other members of the Committee (Dr. W. C. Fawcett, Chairman, and Dr. O. T. Benson) presented this report, as follows:

The following members of the Association were nominated by the Committee, and, upon motion, duly seconded, were elected to the offices indicated:

President: Dr. H. A. Brandes, Bismarck.
President-elect: Dr. C. J. Glaspel, Grafton.
First Vice-President: Dr. F. W. Fergusson, Kulm.
Second Vice-President: Dr. A. R. Sorenson, Minot.
Secretary: Dr. Albert W. Skelsey, Fargo.
Treasurer: Dr. W. W. Wood, Jamestown.
Delegate to A. M. A., 1940: Dr. A. P. Nachtwey, Dickinson.
Alternate Delegate: Dr. C. E. Stackhouse, Bismarck.
Councillors:
Fourth District: Dr. A. D. McCannel, Minot.
Fifth District: Dr. F. L. Wicks, Valley City.
Ninth District: Dr. Charles MacLachlan, New Rockford.

Recommended as members of the North Dakota State Board of Medical Examiners:
Dr. G. M. Williamson, Grand Forks.
Dr. Paul H. Burton, Fargo.
Dr. William F. Sihler, Devils Lake.

President LONG: Are there any other nominations to come from the floor?

DELEGATE: I move that the nominations stand as read.

President LONG: You've heard the motion and the second. All in favor?

All: "Aye".

President LONG: Contrary. (No response). Carried. Any other new business?

Dr. W. C. FAWCETT: The election of Dr. Brandes to the Presidency of this Association, leaves open the chairmanship of the Committee on Economics which he held, I think, for six or eight years. Now these offices are all appointed offices, by the President. We wouldn't expect that Dr. Brandes would name himself as Chairman of that Committee; and I believe and I know that a great many men here who have talked it over and feel that Dr. Brandes should continue at the head of that Economics Committee. In the second place, I think that ought to be in Bismarck at the seat of government—though some of us people from the outside don't think everything should go into Bismarck. I know Dr. MacGregor and I are vitally opposed to that, but this is one point where I do think that the head of the Committee on Economics ought to be—it ought to be in Bismarck. And I don't know of anyone in Bismarck that is better qualified to hold that office than Dr. Brandes. So, Mr. President, I move you . . . I don't know how to put it over—that this House of Delegates elect, if we can do so, Dr. Brandes as head of the Committee on Economics for the ensuing year.

DELEGATE: I second the motion.

Dr. FRANK DARROW: I think the only motion necessary is to have the sentiment of this House of Delegates that he appoint himself.

President LONG: This is a parliamentary procedure beyond me. There's a motion before the House and it's been seconded and certainly there will be discussion.

Dr. BRANDES: Mr. President. I appreciate the kind words of Dr. Fawcett, but I think you are making a mistake to keep a fellow on a committee too long—you need new blood for some of these committees, and I've been chairman for six or seven years now. As I told you this morning, I enjoyed the work, although there were headaches with it at times. However, I'm quite sure that there are a number of men that served on that committee with me that are capable and well able to and well qualified to head that committee, and I'll only be too glad to help them if they call upon me, but I don't think they need much help. I appreciate what Dr. Fawcett said. I really wouldn't re-appoint myself because I don't think it's necessary.

Dr. BENSON: Mr. President. I think we can let that all go by on some of the things that he said. We know he is qualified and he's wanted, but I think it's an added glory if he appointed himself after we pass this resolution.

Dr. W. A. WRIGHT, of Williston: Mr. Chairman, I'd just like to say that as a member of the Economics Committee, I failed to see how our Economics Committee could function without Dr. Brandes. I can't visualize the situation in which we could operate and how we could ever manage to get along without him. I believe that it's absolutely essential he continue as chairman of the Economics Committee, if the Economics Committee is expected to function as it has.

President LONG: Any other discussion? If not, we call for *the vote. All in favor say* "Aye".

All: "Aye".

President LONG: Contrary.

Dr. BRANDES: No.

President LONG: Dr. Brandes, govern yourself accordingly. Is there any other new business?

Dr. LIEBELER: Mr. President.

President LONG: Dr. Liebeler.

Dr. LIEBELER: I have a resolution.

(Dr. Liebeler read at this time the resolution regarding a permanent State Secretary which was included with the other resolutions at the Second Session.)

Dr. LIEBELER: I make this in the form of a motion for adoption.

DELEGATE: Second.

President LONG: Moved and seconded—and open for discussion.

Dr. FRANK DARROW: Just as a start to the discussion, I might ask, did we pass that ruling on $10.00, instead of $5.00 annual dues?

President LONG: That's been passed.

Dr. FRANK DARROW: We will be adding on something for which we haven't got the funds to work with. We can't proceed unless that goes through. I think that should be taken into consideration in the discussion of this resolution or that motion.

Dr. LIEBELER: Mr. Chairman.

President LONG: Dr. Liebeler.

Dr. LIEBELER: Before we eliminate the salary from any further discussion, maybe some explanation should be offered. We feel that too much responsibility has been exacted from the Chairman of our Economics Committee and our Legislative Committee. They've expended far too much time to expect from absolutely anyone. We feel that a full-time Secretary can be obtained and give more of his time than the State Secretary has been able to give because of the honorarium that comes to him now. That this load on the committees will be greatly lessened in most cases is our belief.

President LONG: Any further discussion of this resolution, which was presented in the form of a motion? It's been seconded. If not, all in favor say "Aye".

All. "Aye".

President LONG: Contrary. (No response). Carried. Now we come next to the raising of the annual dues, apparently. That was considered at the meeting this morning, and Dr. Waldschmidt says that it must come up for a second consideration. Is there any motion to that effect?

DELEGATE: I'll make that a motion—increasing the dues to $10.00.

President LONG: Any second?

DELEGATE: I second the motion.

President LONG: Any discussion?

DELEGATE: Will that be adequate?

President LONG: It should be for a start.

Dr. WOOD: That's going to hardly leave you very much better off than you were before. You pay $200.00 a month. That's $2400.00 a year.

President LONG: The outer limit was set at $200.00—it wasn't agreed to pay $200.00.

Dr. WOOD: Well, if you had it at $200.00 that would be $2400.00 a year, and your raising your dues would bring in about $2000—not quite. Around about 390 members. While that would perhaps cover it, yet it seems to me you're going to run things so close that you're again not going to have much money to work for anything else.

President LONG: Any further discussion?

Dr. FRANK DARROW: We ought to talk this over as to what the effect would be on some of the men who have a hard time paying the former dues. We ought to have a little excess for the membership committee to draw from. I think, with most of the men here, there wouldn't be any question about it, but some of the men thought there might be some who might drop out just because of the excess dues.

Dr. WOUTAT: I think the idea is good; from my knowledge of things elsewhere, our dues here are ridiculously low. There is a question in my mind whether they might have to be raised further. Other States dues are considerably above ours, and they carry on similar activities, and they require a full-time secretary. I'm heartily in favor of such a plan. I merely ask that question whether we might not have to raise them further. If it is the opinion, though, that $10.00 will carry us, why, that will be fine.

Dr. FRANK DARROW: Somebody brought up the question this afternoon that some professional society or organizations had dues or assessments amounting to $250.00. Why don't we get some of our bills through?

President LONG: Any further discussion? You've heard the motion to raise the dues to $10.00, and it's been seconded; what's your pleasure? All in favor?

All: "Aye".

President LONG: Contrary. (No response.) Carried. Is there any other new business? If not, we'll proceed to the Reference Committee. Dr. McCannel?

Report of Reference Committee

Dr. A. D. MCCANNEL: Your reference committee met immediately after this afternoon's program, and the way to do is to set the costs by the fruits of our labors. We can't bring them just as well as we thought we could; a little misunderstanding about taking down the records, and some little misunderstanding on getting the records to us; however, I think we can wade through them. The first report will be the Secretary's report. We wish to commend the secretary on his diligent and consecutive efforts. Wish to call particular attention to the section on Question 4: Should the Government or Organized Medicine, either or both, at some future date require some form of postgraduate study for renewal licenses to practice medicine?

Your Committee believes that as regards this Section of the report, it would not recommend the adoption of this Section. We wish to continue with the refresher quizzes, and avoid the expensive set-up that is not justified. In regard to the Section on Radio . . . It is the consensus of opinion of your Committee that they continue the Resolutions as adopted last year at the House of Delegates; and recommend that the component societies avail themselves of the service given by the American Medical Association in furnishing radio talks; this service is available to you through your Secretary, Dr. Skelsey. We approve of ethical, medical publicity before lay groups. In regard to the State Medical School, your Committee is in favor of its continuing, and we wish to commend Dean French on the splendid type of school and the fine type of graduate he is producing. We hope for a favorable report from Secretary Cutter of the American Medical Association. . . . Those are the three points in that Fargo report.

President LONG: Any discussion? The report has been moved—

DELEGATE: I second the motion.

President LONG: It's got to be moved first.

DELEGATE: I so move.

President LONG: Moved and seconded and now it's open for discussion. No discussion. I ask for vote. All in favor?

All: "Aye".

President LONG: Contrary. (No response.) Carried.

Dr. A. D. MCCANNEL: Presented the Reference Committee's report concerning the report of the Committee on Public Policy and Legislation:

Your Reference Committee desires to commend Dr. L. W. Larson and Committee for their active interest. We feel that this Committee should be continued for the coming year. We wish to approve the suggestions made by the delegates from Fargo.

We submit this portion of our report, and move its adoption. (Motion seconded, and carried.)

President LONG: Any discussion? All in favor?

All: "Aye".

President LONG: Contrary. (No response.) Carried.

Dr. MCCANNEL: This is really going too smoothly; I'm afraid we're heading for it later on. Your committee reports on the Committee on Cancer.

The Committee approves of this report in its entirety, and would add this suggestion, that the question of diagnostic centers for the study of cancer be investigated during the ensuing year, and reported in full at our next meeting. It is your Committee's opinion that this will be one of the most important things to be brought up at the next session of the House of Delegates. We further recommend that refresher courses be given on the subject of cancer. (The motion was moved and seconded.)

President LONG: Any discussion on this Cancer question? All in favor say "Aye".

All: "Aye".

President LONG: Contrary. (No response.) Carried.

Dr. FRANK DARROW: On these resolutions . . . it's a little out of order, but with Dr. Nachtwey here, let us enlarge a little—have a discussion about this cancer question. We discussed these things pretty thoroughly up there, and there are a lot of things that we talked about that aren't in the report. It would appear, it is the plan to have this cancer work done by certain centers; which means certain qualifications adopted by the American College of Surgeons, and every case of cancer be submitted to this approved diagnostic group, which group must have a registered pathologist, a specified amount of radium, an X-ray machine of certain capacity; and that such group keep up records of a certain standard. Now another group has come up—one that can come up to this standard is to be appointed as a special cancer diagnostic center, a therapy center—and as you all know there's a great tendency for people to feel that where cancers are handled everything else should be handled. But that's got to be the last word. And it was the consensus of this committee that the members of this society or, at least, of this House of Delegates, be informed thoroughly on the matter; that this Committee go into it in detail, so it can be reported at the next meeting.

President LONG: Any further postmortem discussion. If not, . . . it's been adopted.

Dr. MCCANNEL (continuing the Reference Committee's report): Your Committee on the report of the North Dakota Committee for Maternal and Child Welfare for 1938. Your Committee desires to commend the efforts of the chairman and his associates. We desire particularly to commend the committee's effort in gathering statistics and clearing up the North Dakota record on maternal and infant death. We feel that a real contribution has been made by this committee in the distribution of incubators at such a low cost. Your committee desires to commend that portion before moving its adoption.

Dr. M. MACGREGOR, of Fargo: Called attention to that portion of his Councillor's report wherein he deprecated the frequent and stereotyped use of the word *appalling* by lay and medical people in magazines, radios and other modes of conveyance to the public zest for news and even sensationalism, as regards the alleged lack of proper care of mothers, babes, and children by physicians throughout the different states.

Stated he had hoped that some other members of the Association here assembled would have made some comments thereon. As for himself, he was of the decided opinion that much of that propaganda and criticism was both illtimed and often untruthful.

The Reference Committee's report on the report of the Committee on Maternal and Child Welfare was then adopted by the House.

Dr. McCANNEL, of Reference Committee: The Committee on Radio:

The Committee's report on the Committee on Radio having commented on the Secretary's report on Radio, we find nothing further to report. We recommend the adoption of this section of the report. (The motion was made and seconded.)

President LONG: Any discussion about the radio business?

Dr. McCANNEL, for Reference Committee: The Committee's report on the report of the Committee on Venereal Disease. We desire to endorse this entire report; submit this report and move its adoption. (The motion was made and seconded.)

President LONG: No discussions? All in favor say "Aye".

All: "Aye".

President LONG: Contrary. (No response.) Carried.

(President Long called a five-minute recess.)

Dr. McCANNEL: The Reference Committee's report on the resolutions passed by the Sixth District Committee. Your committee had an exhaustive discussion of this resolution, calling in Dr. Fortin of Fargo as representative of the American Orthopedic Society. In order to refresh the delegates and councillors, I will read the resolution as presented. "Section I, a resolution read as follows: We are opposed to the present method of operation in the Crippled Children's program, because the unfair distribution of the work and that only a very few surgeons have been permitted to take care of these children." Inasmuch as the funds available for this work is controlled by the American Orthopedic Board in Washington, and it is their decision that all of this work must be done by members of the American Orthopedic Society, your committee's opinion was to the effect that well qualified surgeons should be used as much as possible in the furtherance of this work. Section II of their resolution read as follows: "It is our opinion that the members of the American College of Surgeons, American Board of Surgeons, Western Surgical Association and other boards of special branches of surgeons are capable of performing the necessary procedures in the care of these patients." Your committee has been informed by Dr. Fortin that the Committee in Washington which has the dispensing of these funds, do not recognize members of these associations, and recognize only members of the Orthopedic Board, as we stated before, for this type of work. But your committee would urge Dr. Fortin and Dr. Swanson, who have charge of this work for this state, to permit well qualified surgeons wherever possible in the state to carry on this work. Section III: "We also recommend that the Crippled Children's program be administered by a graduate of reputable medical schools, and licensed to practice in the state of North Dakota. We, therefore, recommend that the state service for Crippled Children be administered by the official State Health Agency." Your committee feels that every effort of the State Medical Society should be engaged to that end that this may be accomplished, and that this crippled children's program be administered by the State Public Health Agency. Your committee submits this section of its report and moves its adoption. (The motion was made and seconded.)

President LONG: Open for discussion.

DELEGATE: How are you going to do this? How are they going to get in the class work?

President LONG: This same recommendation was contained in the report of the Public Health Committee. Shall I entertain discussion of ways and means?

Dr. McCANNEL, for Reference Committee: I might say that the report comes to us 28 states in the Union are limited to the State Board of Health. We are one of the states that have it under the Public Welfare Board. I don't want to sponsor or start a discussion because I'm on a Public Health Board, but I know the difficulty they had in getting the standards set up to meet your Social Security Board at Washington, so that we could avail ourselves of this money for North Dakota. But public fees are administered under this other plan, so there is no reason why North Dakota shouldn't try. The objection to this is that the people who are administering the program which came to us are lay people, with the exception of a medical advisor who has not been consulted in many cases. It's better and safer if it's administered by a regular graduate of medicine.

Dr. FRANK DARROW: *I believe, Mr. President, that would* have to come before the legislature, and this resolution can be referred to the Committee on Legislation, to look up means for obtaining this agency.

President LONG: Is there further discussion. If there's none, we'll call for the vote. All in favor of this resolution as recommended say "Aye".

All: "Aye".

President LONG: Contrary. (No response.) Carried. On with the next.

Dr. McCANNEL, for Reference Committee: Your Committee's report on the report of the Committee on Crippled Children. Your committee refers you to its previous report on resolution by the Sixth District Society. The Committee moves the adoption of this report.

Your committee's report on the resolution of the Sixth District Medical Society relative to raising or increasing the dues to $10.00. Your committee recommends adoption of this report. (The motion was made and seconded.)

President LONG: All in favor — Is there any discussion? All in favor say "Aye".

All: "Aye".

President LONG: Contrary. (No response.) All right, will you go ahead with the next.

Dr. McCANNEL: Your Reference Committee's report on the report of the Committee on Medical Economics. We are entirely in accord with Section A which states that the insurance plan be eliminated, and the program be placed on a direct relief basis. Section B. An allotment of funds from the F. S. A. to the F. M. A. C. be on a basis of a minimum of $36.00 per year per family. Your committee feels in view of the evidence submitted to it that this should be changed to $33.00 a year. Section C. That the fee schedule remain the same as in the previous program. Your committee feels that this is correct. Section D. That we make a sincere effort to correct any irregularities on the part of the physicians participating in the program. Your committee is in hearty accord with this section. Your committee further recommends that this following resolution be adopted: We agree to limit participants in medical care program to active emergency grant families of F. S. A. We understand this to include only the definitely indigent and that standard grant clients be not admitted to this program. A further recommendation: Any program entered into by the North Dakota State Medical Association with the F. S. A. must be on a state-wide program, and *not* by individual units. We further recommend that . . . no direct loans be made to families and feel that this program should be administered by the F. M. A. C. Further resolution: In order to insure the fact that only the needy receive this care, we insist that all clients under this program be certified by the local welfare board for medical care. Further resolution: It is unnecessary for this committee to take any action on the objection of the F. S. A. that professional groups are collecting in addition to money agreed upon in the fee schedule, as it has been the recommendation of this committee that only true indigence be included in this group. These recommendations and resolutions are made in view of the fact that Federal aid is necessary, due to the depletion of state and county funds. Your committee desires to present this section of its report and move its adoption. Your committee has carefully considered the Council's report and we feel that all controversial matters have been covered in the report as submitted. (The motion was made and seconded.)

Here followed many discussions on the subject of medical relief in connection with F. M. A. C. and the F. S. A.

Attention was called to the differences between the standard grant class and the emergency grant class.

One speaker urged full consideration of the whole affair, in order that delegates might carry back to their local societies full data exchanged at this meeting, especially as there has been some adverse criticism on the part of certain members who evidently were not fully informed as to all of the complications embraced in the drawing up of the so-called "understanding" with the federal-state authorities. Then, too, in view of recent experiences in the development of the relief programme, there are some members who are utterly opposed to any alliance with governmental agencies covering this relief work. Some delegates, while protesting against the abuse of the card system, under current plans, also referred to their earlier disagreeable experiences in trying to get from local welfare boards, authorization for emergency work, notably during night time, when it was very difficult to get in touch with local or county officials. By previous correspondence, and as brought forth at this annual session, many physicians felt that in the issuance of the cards, the authorities had not exercised sufficient care in impressing upon the card holders that the medical care was for emergency relief only. Some of the speakers felt that better results would be obtained were the welfare boards allowed to examine critically the merits of each family or person applying for medical care. Vigorous discussions as to the merits of the two systems. Some men felt that there has been too much of a tendency, under the present plan, for card holders to go shopping, i. e., not only to consecutively visit the different doctors of the smaller towns, but also to travel to larger centres, seeking additional advice and care; whereas, under ordinary conditions, such peripatetics would be more inclined to restrict their travels and to be contented with the local physicians.

In rebuttal, the Reference Committee stated that all these facts had been duly presented, in earlier sessions, to such Committee, and had been carefully considered; that now the said Reference Committee were open to all arguments and amendments that would help correct abuses and conditions deemed unfavorable to the men in the field. What now was desired from the House of Delegates was some decision that would best suit the present conditions, as a whole. The Committee admitted that what had been stated in these sessions was well justified in being brought to the attention of the House.

These discussions were had in view of the fact that earlier the annual report of the Committee on Medical Economics had been referred to the Reference Committee, for consideration not only by this latter Committee, but also for consultations with that Committee of such persons who might be interested in appearing at these hearings.

Dr. FRANK DARROW, of Fargo: Mr. President, I think I can wind this up. I think the only way to dispose of this at this time, is to phrase this in general terms, following this discussion, in such a way that our Economics Committee will make the best arrangements possible under the circumstances; and that the Economics Committee take into consideration the discussions that we have had here, and endeavor to be sure that these clients are indigents.

Motion seconded, and carried.

The third meeting of the House of Delegates, May 8, 1939, terminated at 10:20 P. M.

*Electrically recorded by Philip E. Parbury.

The following programme was carried out in its entirety:

SCIENTIFIC PROGRAM

May 9th, 1939

Morning Session

9:00—Diagnosis and Management of the Surgical Gall Bladder—E. M. Jones, M.D., St. Paul, Minn., Associate Prof. Surgery, University of Minnesota.

9:45—Maternal Mortality in North Dakota—John H. Moore, M.D., Grand Forks, North Dakota.

10:15—View Exhibits.

10:30—Medical Conditions Complicated by Pregnancy—Ralph A. Reis, M.D., Chicago, Ill., President of the Central Association of Obstetrics and Gynecology.

11:15—Syphilis—Problems in the Treatment of Syphilis—H. E. Michelson, M.D., Minneapolis, Minn., Prof. Dermatology, University of Minnesota.

Afternoon Session

2:00—Dermatology for the General Practitioner—H. E. Michelson, M.D., Minneapolis, Minn., Prof. Dermatology, University of Minnesota.

2:45—Medical Legislation—L. W. Larson, M.D., Bismarck, North Dakota.

3:15—View Exhibits.

3:30—Diagnosis and Treatment of Eye, Ear, Nose and Throat Conditions, which are of particular interest to the general practitioner—A. D. McCannel, M.D., Minot, North Dakota.

4:15—Office and Hospital Management of Ano-rectal Diseases—L. A. Buie, M.D., Rochester, Minnesota.

Evening Session

At 7:30 P. M., the annual banquet was held at the Gardner Hotel, Dr. Frank I. Darrow, of Fargo, presiding. Dr. W. H. Long, President, read his Annual Address, and Dr. Frank L. Eversull, President of the North Dakota Agricultural College, gave the Annual Oration.

May 10th, 1939—Morning Session

9:00—Emergency Orthopedic Problems—Harry J. Fortin, M.D., Fargo, North Dakota.

9:45—Encephalitis—Jos. P. Leake, M.D., Washington, D. C., U. S. Public Health Department.

10:30—View Exhibits.

10:45—An Approach to Some Common Behavior Problems—F. C. Rodda, M.D., Minneapolis, Minn., Prof. Pediatrics, University of Minnesota.

11:15—Diagnosis and Treatment of Cardiac Emergencies—F. J. Hirschboeck, M.D., Duluth, Minnesota.

Afternoon Session

2:00—The Indication and Technique of Artificial Pneumothorax, Thoracoplasty and Extrapleural Pneumothorax in the Treatment of Pulmonary Tuberculosis—G. A. Dodds, M.D., San Haven, North Dakota, superintendent, State Tuberculosis Sanatorium.

2:45—Arterial Hypertension—Prognosis and Management—S. Marx White, M.D., Minneapolis, Minn., Prof. Internal Medicine, University of Minnesota.

3:30—View Exhibits.

4:00—Diagnosis and Treatment of Gastro-intestinal Hemorrhage—F. J. Hirschboeck, M.D., Duluth, Minnesota.

During the afternoon sessions, Dr. W. H. Long, the retiring President, expressed to the assembly his great appreciation of the honor which had been conferred upon him by electing him to that office. Dr. H. A. Brandes, of Bismarck, was then inducted into the office of the President. Dr. Brandes, too, acknowledged the honor of the office, and expressed his hope that he also might be of service to the Association.

Presidential Address

W. H. Long, M.D., Fargo, North Dakota

Mr. Chairman, Guests of the Association, Fellow Members: I wish first to express my thanks and those of the Association to our visiting guests, who have given so generously of their time and effort to make our scientific session a successful one. Then, I should like to thank you for the privilege and honor of serving you as President the past year. The work has been stimulating and rather exacting, but entirely pleasant, due to your kindly and efficient coöperation.

You are too familiar with our problems of economics and relief to relish any recitation of them. There are certain lessons we have painfully learned by our brief contact with widespread Governmental medical assistance. In 1933 and 1934 the people of a large part of our state were in dire distress due to depression and drought. As an emergency measure we embarked on a program of medical federal relief. This plan was workable and just to both the donors and recipients in its first years. Our agreements were renewed on the basis of our earlier experiences. But we have seen how false the compilation of statistics of a few months proved to be in affording a basis for computing the continued cost of this project. The two dollars per family per month, which was adequate in the first months, has proved entirely too small for later demands.

We have also seen how the interpretation of lay officials in extending the scope of our plan has led to the inclusion of many families and hundreds of individuals who should never have been included. The policy of high pressure salesmanship; the inclusion of individuals who have received but minimal government aid, such as seed loans; the carelessness with which dependents were listed, have all contributed greatly to its failure. Another important adverse factor was the failure of lay officials to make clear to the recipients that the scope of this program was for emergency service only.

You have sent your representatives to this meeting well instructed on these subjects and I am sure their expressions in the House of Delegates will greatly aid your officers in shaping our policy for the ensuing year.

There is emphatic belief throughout our profession in its ability to solve the problem of adequate medical service to all. The acuteness of our needs in past years has led to some costly errors. But as long as we insist upon our just part in shaping these programs, these errors may still be corrected.

That this adequacy of our profession to serve the needs of our people is not concurred in by all is well shown by the trend in National medical legislation, the national polls and the abundance of lay discussions in the popular magazines of the past years. All these efforts to displace the old and start the new schemes are but a part of a similar trend in our whole political and economic life. I do not feel that it is a reflection upon us in the sense of failure in the past but is the result of this overwhelming urge to change all manner of things.

Our part in shaping these changes that seem bound to come must consist in insisting that there be no relaxing of the high standards of service rendered. These high standards of service are the results of years of striving for our own professional betterment under the private system of practice with the stimulation of individual competition. Its achievements certainly stand well the comparisons with those of other systems in vogue elsewhere in the world. Also we must insist that any plan for providing adequate medical care for all, at a price which is fair for all the people also must include fair remuneration for those who render that service.

The medical man is a peculiar hybrid. He is mostly a scientist, less a business man, least a politician. His devotion to his patients and to the demands of sickness enslaves him. His attention to his political and economic state is one of almost complete neglect. Therefore, in these matters he must look to organized medicine to protect his interests. Our organization is one of the most democratic possible in its form; hence its success depends most upon the energies and behavior of its members. Its officers may make mistakes of policy and of execution, but its success is your success. Therefore, I urge upon every individual the necessity of wholehearted coöperation in every undertaking sponsored by either your local or national association.

NORTH DAKOTA STATE MEDICAL ASSOCIATION ROSTER--1939

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Brandt, A. M. ——— Bismarck
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Freise, P. W. ——— Bismarck
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Gerdes, Maude ——— c/o Children's Bureau, Washington, D. C.
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Griebenow, F. ——— Bismarck
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Heinzeroth, G. ——— Turtle Lake
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LaRose, V. J. ——— Bismarck
Larson, L. W. ——— Bismarck
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Lipp, G. R. ——— Bismarck
Monteith, G. ——— Hazelton
Moyer, L. B. ——— Carson
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Quain, E. P. ——— Bismarck
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Smith, L. G. ——— Mandan
Spielman, G. ——— Mandan
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Vonnegut, F. F. ——— Hague
Waldschmidt, R. H. ——— Bismarck
Weston, D. T. ——— Mandan
Weyrens, P. J. ——— Hebron
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Faradic Shock Treatment of the "Functional" Psychoses*

A *Preliminary Report*

Nathaniel J. Berkwitz, M.D., Ph.D.
Minneapolis, Minnesota

CONSIDERABLE interest has arisen in the therapeutics of the mentally ill since Sakel's[1] startling discovery of the use of insulin shock for the treatment of schizophrenia. Metrazol,[2] triazol,[3] picrotoxin,[4] nitrogen gas[5] and other substances have been used since, with more or less encouraging results. In almost all of the numerous reports of shock treatment, the percentage of "cures" exceeds the number of spontaneous remissions recorded previously in the literature. Even though relapses occur in a large number of the cases, reports show that there is justification for the administration of shock treatment.

Success has been reported not only in schizophrenia, but also in psychoneurosis without psychosis, depressive psychosis,[6] and other functional mental illnesses.[7]

With the increasing number of successful cases reported, even the most critical observer must admit that shock therapy has accomplished more than any other form of therapy used for many years. The most serious drawback to this treatment is the occurrence of such complications as joint dislocations, fractures, heart damage, permanent brain trauma, and even an occasional death.[8] Because of the extreme fear and apprehension shown by most patients towards the treatment and because of the violent convulsions and serious complications which result at times, an extensive search for some satisfactory substitute is in progress.

Theories of Action of Shock Treatment

No satisfactory explanation for the success with the various types of shock therapy has as yet been offered. Sakel's hypothesis of the "neutralization of the excitant hormone" and "the blockade of the nerve cell" has not been accepted by neurophysiologists. Meduna's explanation is that a "biological antagonism exists between epilepsy and schizophrenia." He believes that epileptic attacks change the chemical, humoral, haematological and other aspects of the organism. This theory is also inadequate and inconclusive. Friedman[9] believes that theoretically, the benefit from metrazol in mental conditions results from stimulation or irritation of the whole central nervous system to such an extent that mental "barriers" to certain thought processes are broken down, allowing these thought processes to be carried on properly. Gellhorn[10] believes that insulin, metrazol and other substances used to produce convulsions benefit the patient by the production of anoxia which in turn stimulates the sympathetico-adrenal system. He even believes that Dauerschlaf (deep and prolonged narcosis) by the use of barbiturates also inhibits oxidation in the brain and produces anoxia which acts as a powerful sympathetic stimulant, thereby producing beneficial results. Jackson and Jackson[11] have expressed the belief that the sudden powerful rise of the systemic blood pressure caused by acute convulsions forces open the brain capillaries or large cerebral vessels, increasing the flow of blood to the brain supplying sufficient oxygen to the cerebral cells which were depressed by some obstruction to the blood supply. Reese and Vander Veer[12] believe that shock treatment produces an unusual disorganization and reorganization gradually blotting out the psychopathological patterns. Because of the extreme terror and fear experienced by most patients undergoing this treatment, the theory that patients responded favorably because of the "death threat" has been advanced by some.

Shock and Suggestion Are Therapeutic Factors

While many workers are trying to find some drug which will not produce such terror and apprehension as is incidental to these new treatments, a few feel that the intensity of the fear has a beneficial psychological effect and reclaims the minds of the patients from their mental aberrations. Obendorf[13] states, "It seems to me that psychological shock and fear reaction may bring about an analogous interruption, perhaps in the habitual organic structural currents which have been established by thought habits. Such interruptions may produce a change which permits reorganization and readjustment of the thought flow thereby acting as a therapeutic agent." Fear as a psychotherapeutic agent is old in its application. Benjamin Rush[14] in his book on "The Diseases of the Mind" published in 1818, reported several cases in which fear cured psychoses. A treatise published during the eighteenth century[15] describes the use of fear in the treatment of mental disorders through such devices as ducking and the rotating chair. Deutsch[16] writes of various techniques used from 1780 to 1820 in frightening the patient out of his psychosis, such as letting him fall through a trap door into a well of cold water, chaining him to a well and allowing water to rise until he is practically drowned, or by throwing him into a dungeon filled with snakes and vipers. According to Lewis (Director of the New York Psychiatric Institute),[17] it is not unusual to see a patient restored to sanity as a result of a sudden emotional shock. He has reported several such cases.

Metrazol injections provoke so much fear and apprehension that the patients usually protest against further treatment. Because of this experience, many writers recommend an immediate repetition of the injection if unconsciousness is not reached. The patient may remain apprehensive and disturbed for some time following an

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insufficient dosage. According to Cannon,[18] experimental and clinical evidence shows that pain, fear, and rage reactions stimulate the sympathetico-adrenal system in the hypothalamic region. Gellhorn believes that anoxia resulting from insulin and metrazol treatment stimulates the same region.

Practically none of the writers who have written on shock therapy considered the importance which suggestion plays in the treatment. With the reassurance that the shock treatment will benefit the patient in spite of its unpleasant nature, indirect suggestion is definitely active. The patient has concrete and visible evidence that something is being done for him. It is a foible of human nature which assures the acceptance of concrete things with greater readiness than mere assertions and persuasions of a physician. Cannon stresses the futility of trying to argue a patient out of his emotional reactions since the cortex has no direct control over the thalamus. "In contradistinction to persuasion the methods of which consist in logical exposition and argumentative proofs," Jacoby[19] says, "suggestion acts by means of a direct transplantation of mental states, ideas, emotions and sensations." Therefore shock treatment may permit the physician to use other means of treatment than have been the custom, such as stimulation of the emotions and stronger indirect as well as direct suggestion.

THE USE OF ELECTRICITY IN THERAPY

Electricity has been used in the treatment of mental illnesses for many years. Richard Lovett, a lay clerk of Worcester Cathedral in 1756 treated a large number of cases with electrical shocks.[20] He claimed success in almost every known disease entity. Since his time, for over a century, electricity was considered by many as a universal panacea. Huff[21] in 1853 states, "No nervous affection whatever should be regarded as incurable until electricity has in some form been tried." Arndt[22] in 1870 and Allbutt[23] in 1872 were the first to report systematically and in detail, studies of cases of insanity treated with electric shock treatment. Their findings were so encouraging that this form of treatment became quite popular for many years. Arndt reported best results with "simple depression and marked apathy." Allbutt reported "marked improvement in primary dementia, and a distinct improvement in manic and atonic melancholia." In 1883, Erb[24] discussed the vasomotor effects of electricity and wrote, "It is a matter of experience that vasomotor disturbances play a predominant part in the development and symptomatology of many psychoses." Haynes[25] in 1884 observed that, "Recent cases and functional diseases are benefited by electrical treatment while old cases and structural diseases resist its influence." This statement is identical to the experience of those using shock treatment today with insulin, metrazol, and the like. Blandford[26] in 1886 when discussing the encouraging results he obtained, wrote, "I am inclined to think in several cases the effect was moral rather than physical." But interest in electrical shock treatment gradually waned and by the beginning of this century the treatment was no longer popular. The loss of interest may be due in part to the fact that all kinds of cases were treated, for psychiatry was not developed as it is today and differentiation between organic and functional diseases was not as well established. Also it became generally accepted that electricity was used simply because of its suggestive action and its use as a specific was shown to be unfounded; hence, physicians lost their faith in its efficiency.

With the introduction of various types of shock therapy by means of different chemical substances, Bini[27] in 1937 suggested that electricity could be used as a physical means of producing epileptic attacks in place of chemical substances. By the passage of "street current" (120 volts) for a very short time (1/20 to 1/15 second) through the entire body of a dog, placing one electrode in the mouth and the other in the rectum, he was able to produce typical epileptiform seizures. The animal lost consciousness for one to two minutes. Bini described widespread and severe alterations in the nervous system and concluded by stating, "The alteration met with in animals does not permit us to exclude the possibility of these physical methods in human therapy, and that the changes may be responsible for the favorable transformation of the morbid psychic picture of schizophrenia." Cerletti and Bini[28] had the courage to shock a number of patients into convulsive seizures and unconsciousness, using from 300 to 600 milliamps and 80 to 115 volts from 5/10 to 7/10 of a second. They report results as good as those obtained from pharmacological shocks. A current of such high milliamperage and low frequency is apt to produce severe changes in the central nervous system.

On the basis of observations and experiences of the various treatments described above, it occurred to the writer that a physical agent which could provoke physiological reactions without producing harmful physical complications should be tried. Faradic shocks, though of a harmless nature, provoke fear and apprehension such as is experienced in other forms of shock therapy. With this premise the writer has tried a new form of treatment in psychoses.

DESCRIPTION OF APPARATUS AND TECHNIQUE

With the aid of Dr. W. J. Ferguson of the staff of the Minneapolis General Hospital, a simple apparatus was devised for the production of a faradic current. The source of the high potential current used for stimulation was a Model "T" Ford spark coil; a six-volt dry cell battery of the "A" type was used to energize the spark (induction) coil. A resistance of 500,000 ohms (wire wound) was used in series with the secondary winding of the induction coil to reduce the milliamperage of the current used. The maximum voltage produced was approximately 20,000 volts. Without the wire wound resistance, the maximum voltage is approximately 19,000 volts. Cambridge E. K. G. electrodes and Cambridge electrode jelly were used. One electrode was placed on

the forehead and the other on the nape of the neck.

The patient's breakfast is withheld and an enema is given before the commencement of the treatment. From five to ten shocks of one second's duration each are given with one second intervals between each shock. Such current can be safely tolerated in patients having no vascular disease. Physiological changes produced with such stimulation are reversible and harmless. The patient's eyelids and facial muscles twitch, the head jerks, and evidence of fear and pain is exhibited. The patient does not appear to be in mental anguish or to have the violent jerking as is seen in convulsions.

Immediately after the electrical shocks are given, pentothal sodium is injected intravenously to produce prompt sleep. This drug has been used extensively since 1935 as a general anesthetic for short operative procedures. From 4 to 7 cc. of a 5 per cent solution (50 mgm. per cc.) is injected slowly as is recommended by the manufacturers of the drug. Surgical anesthesia is attained in about thirty seconds. Unconsciousness lasts for several minutes depending upon the amount of the drug administered. When the patient becomes unconscious, the respirations are shallow. As with all barbiturates, death results from respiratory failure; for this reason the respiration must be watched very closely. A cotton butterfly[29] made of a wisp of cotton is attached to the upper lip with one wing overlying the nostrils and the other wing overlying the lips, to note the pulmonary exchange of air. Only an expert anesthetist or one well versed in its administration and its dangers should employ pentothal sodium. By the administration of an inhalant such as spirits of ammonia, the patient may be kept awake. Thus, the interviewer often may gain much information of the content of his thought, which is not obtainable at other times. This same method is employed after the intravenous injection of sodium amytal.[30]

From ten to twenty daily treatments are recommended.

DISCUSSION

According to K. Wilhelm Stenstrom,[31] professor of biophysics, University of Minnesota Medical School, currents obtained by the method employed are safe for the following reasons. The wattage drain of the spark coil and battery used is approximately 20 watts (6 volts × 3 to 4 amperes). The output wattage must be the same or less. Since the secondary coil has a great resistance and the efficiency is below 100 per cent, the output wattage must be less than the input. The maximum voltage produced is approximately 20,000 volts without the resistance. Therefore 1 milliampere average current is the maximum output although the instantaneous current is much higher. Very little current is conducted through the heart by this method. Fifty milliamperes of low frequency sinusoidal current are used often for muscle and nerve stimulation; in diathermy much heavier voltages and amperages are used without causing tissue damage. The frequency produced by the induction coil described above lies between that of the low frequency stimulators and that of the diathermy apparatus, but close to the latter.

The electrodes are placed on the forehead and neck because in that position there is less danger of affecting the heart action, and because of its use in suggestion. By the employment of faradic shock, psychological effects from the stimulation in all probability affect indirectly the hypothalamus (autonomic functions) as do insulin and metrazol treatment, but with far less danger of serious complications. With the use of a fast acting and powerful anesthetic, the patient is relieved of fear and apprehension which follows physiological or pharmacological shock and a more satisfactory condition for the introduction of psychotherapy is created. Jacoby has stated, "Whatever benumbs the power of judgment and resistance, whether it be fear, passionate excitement or a strong hypnotic will, enhances the use of suggestion." Janet[32] made the following statement, "The psychotherapist who understands his patient well and who knows how to use psychological stimulation succeeds with any method he cares to use."

The writer does not believe that schizophrenia is actually "cured" by either insulin or metrazol, but that their administration probably interferes with the various habit patterns of diseased thought processes and permits the therapist to replace them with healthy ideas by means of psychotherapy. Not only schizophrenia, but other forms of functional illnesses have been reported to respond favorably to various means of shock therapy. It is generally accepted that good results are not obtained in advanced cases. Friedman emphasizes the need for reëducation of the patient by means of occupational milieu and psychological therapies in conjunction with insulin and metrazol treatment. Even Sakel advocates psychotherapy as a necessary adjunct to shock therapy. Meduna[33] has stated, "Far from considering the convulsion therapy as the only possible way of curing schizophrenia, I think that it is only a first step on the as yet unaccustomed biologic road of influencing the schizophrenic process. It is necessary to try other substances, as well as to search for the factor mobilized by the convulsion and causing its beneficial effect. In this way it will perhaps become possible to eliminate the convulsion and apply only its secondary effects."

The method of treatment described in this paper is another means of approach to a very intricate problem. It may clarify some of our knowledge as to the proper form of treatment of psychoses and psychoneuroses and it may offer some new understanding of the mechanisms involved in these conditions. One of the main advantages of this treatment is the minimal amount of danger it entails.

This form of treatment has been tried on a small series of "functional psychoses" with very encouraging results. Because of the small number of cases treated and the short period of time for observations, no definite conclusions can as yet be formed. It may be possible that this method may be an adequate substitute for the more drastic forms of shock therapy being used today. Further work is being done in this study.

CASE REPORTS

Case 1. E. S., female, aged 34, a high school graduate, who has been married eighteen years and has two children. The history revealed no other mental disease in the family. According to her husband, she was always quiet and reserved, and never had any previous mental illness. In August 1938 they moved into an apartment building which she disliked as she had "never lived in an apartment building before." In April 1939 she developed ideas of reference, thinking the neighbors were talking about her because she praised her husband to them. On May 9th she became restless and developed auditory hallucinations. Voices told her to end her life. She was placed in a private hospital and while there the voices told her to escape, that the building was going to be set on fire, and she feared a mob was going to lynch her. She became so disturbed that she was transferred to the Psychiatric Ward of the Minneapolis General Hospital on May 11, 1939. She insisted she heard a radio broadcast that her husband and two children were killed in an automobile accident. For hours at a time she stood motionless with a worried expression and rarely spoke even when addressed. When she did speak she talked in a low, soft, whining manner in monosyllables. She insisted that a nurse she had never seen before was someone she knew. The psychosis was characterized by paranoid trends with some depressive features. I considered it schizophrenia but some might call it a paranoid state.

On May 27th faradic shock treatments were begun following the usual method described above. They were administered daily for six days. After the fourth treatment she stated that the hallucinations had left her. After the sixth treatment she talked freely and her speech became normal. She showed more initiative and interest in her surroundings. Because of the marked improvement, the treatments were discontinued on June 1st. On June 5, 1939, she was discharged from the hospital markedly improved. On June 20th she was interviewed and no mental aberrations were revealed in the examination. According to her husband she had been acting normally since she left the hospital. The patient was happy and pleased with her recovery. She stated that she noted improvement with each successive treatment and expressed her gratitude for what had been done for her.

Case 2. S. N., male, aged 20, single. The family history was negative except that his maternal grandmother had a postpartum psychosis in her late thirties, and again became psychotic during her menopause, requiring permanent hospitalization.

He was considered exceptionally bright and finished high school with honors. In his senior year he became nervous and developed an unusual interest in girls and in religion. He decided to follow missionary work and entered a seminary. While there he studied industriously, but his grades were only mediocre. His school work became worse and he was forced to leave. He then obtained a job as a janitor in a hospital. In March 1939 he went to the county attorney and gave himself up as being responsible for the death of a patient who died following an operation. He stated that he had had a vision that the death was going to occur and he was responsible for the death because he talked to a nurse in charge of the case and to the relatives of the deceased in an elevator. He was admitted to the Psychiatric Ward of the Minneapolis General Hospital on March 7th. In the hospital he said he was worried because he had masturbated for several years and was unable to stop this practice. He talked a great deal about the Bible and insisted that he wanted to be a missionary worker. He was active, alert, and garrulous. Most of the time he talked about religion with patients in the wards. The diagnosis was schizophrenia, hebephrenic type.

He was given fifteen insulin shock treatments and showed some improvement, but still harbored delusions. He was then given twelve metrazol treatments, but showed no improvement.

After an interval of a few days he was given faradic shock treatments daily. After the fourth treatment he became very excited and required sedation almost continuously. He stated that he was not permitted to carry out God's will and tried to injure himself by hitting his head against the wall. Because of his marked excitement and persistence to harm himself he was committed to a state hospital. Condition unimproved.

Case 3. R. K., female, aged 42, single, quite obese. Her mother developed some form of psychosis following a miscarriage at the age of 38 years and never completely recovered. The patient kept house for two older brothers on a farm. She was never considered bright and left school in the seventh grade. For twenty years she kept company with a man whom she expected to marry; she admitted having had frequent sexual relations with him. Ten years ago while riding in a car with her brothers she was suddenly startled by a man whom she believed to be carrying a revolver. Her brothers did not see the gun. She was nervous for two and a half months following this experience. Six years ago her fiance saw her less often "because she became more difficult to get along with."

A year ago she began to suspect that her fiance was untrue to her. In March 1939 she claimed she heard a rumor that he was married to someone else. She became so upset that her brothers couldn't care for her at home. They took her to a local hospital where she was treated for about two weeks. Her condition grew worse and on April 19, 1939, she was transferred to the Glenwood Hills Sanitarium. She talked about religion; frequently fell upon her knees and prayed aloud and said, "I want to die a Catholic," "Don't take away my religion," and frequently insisted on seeing a priest. She also said, "I want to be a young lady even if my hair is gray," and "I want to be a young lady and not a mother." She was negativistic, ate poorly, and showed no interest in her appearance. She constantly dug into the skin of her face with her nails. She was diagnosed as schizophrenia, paranoid trend, and mental retardation.

Nine metrazol treatments were given her. She showed some improvement after the sixth, but after the ninth treatment she appeared more lethargic and confused so the treatment was discontinued on June 6th. On June 11th daily faradic shock treatments were instituted. After the fifth treatment she stopped talking about religion. She dressed and fed herself, but talked less and continued to be suspicious and apprehensive. After fourteen treatments she was taken home in an improved condition.

Case 4. M. H., male, age 38, single, tall and undernourished. He gave a history of completing grade school at 16 years and was never a good student. At twenty-two, while playing amateur football, he received a mild cerebral concussion. He became "depressed and couldn't concentrate" for one and one-half years. In 1926 the depression re-occurred for six months. He was always shy and timid and never went out with girls. Three years ago be began to have auditory hallucinations. Previous to this time he worked irregularly as a common laborer, but has not worked since. He became more seclusive and lost interest in his surroundings. In his visions he saw a wealthy woman and said that he wanted to marry her, but could not afford to. He confessed that he had sexual relations with her spiritually. He entertained ideas of suicide and tried to end his own life by hanging, but lost his nerve and went to jail voluntarily because he believed that something was wrong with his mind. He was transferred to the Minneapolis General Hospital on May 22, 1939. There he spent a considerable time on his knees praying. He mumbled to himself, refused to eat, but drank a great deal of water saying the spirits told him to do this. He was found masturbating frequently and often urinated on the floor or in bed. He thought that the spirits were going to cut off his penis. Diagnosed as schizophrenia, paranoid type.

On June 1, 1939, daily faradic shock treatments were instituted. After the second treatment he became more talkative. After the tenth treatment he responded much better to questioning. He said, "I think that the treatment is helping me," and, "I don't feel so nervous." After the thirteenth treatment he began working in occupational therapy and said that he did not hear voices any more. He was given twenty treatments. On June 26th he conversed without being questioned, read newspapers, played cards and proudly showed his accomplishments in woodwork. The patient was anxious to return to work and was discharged July 12th as markedly improved.

At the present time the writer is reporting only the first four cases treated with faradic shocks and pentothal sodium. No selection of cases was made and all available cases of functional psychosis were treated.

Case 1 made a total recovery. This case might have recovered without any form of treatment, but it is apparent that the duration of the disease has been shortened.

Case 2 showed no improvement, but he did not respond to fifteen insulin or to twelve metrazol treatments. He was committed to a state hospital after he received only four faradic treatments.

Case 3 showed no improvement after nine metrazol treatments, but she became more quiet and cooperative after fourteen faradic shock treatments Because of her low intelligence and long unsatisfactory history, the outlook of her condition was not favorable.

Case 4 made a social recovery. Minor symptoms of shyness and shallowness of affective response were still present, but his response to the treatment is remarkable considering the long duration of his illness.

SUMMARY

An approach to the problem of therapy for "functional" psychoses has been presented The essential features are, namely: (1) with suggestion the patient realizes that something concrete is being done; (2) with the creation of fear and pain, emotional reactions are stimulated and in turn affect the autonomic nervous system; (3) with the intravenous injection of pentothal sodium, the patient is relieved of the fear and apprehension he is subjected to by the electric current and the physician may gain much information of the thought processes which are not obtainable otherwise

Though the results in a small series of cases so treated are very encouraging, the series is too small and the period of observation is too short to arrive at a definite conclusion If this method proves efficacious, it will be an obvious improvement over the various methods of shock therapy described to date and it will clarify our understanding of the mechanism of shock treatment.

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Excretory Urography in Tuberculous and Debilitated Patients*

With Special Reference to the Use of Organic Iodide Dyes

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IN the diagnosis of renal tuberculosis, several methods of study may be employed. Excretory urography, a method which has proved extremely valuable in other types of pathology of the urinary tract, has been suggested but avoided on the theoretical ground that introduction of an iodine compound into the body of the tuberculous patient might make his disease worse. In short, tuberculosis has been considered a contraindication to excretory urography, and literature cautioning against use in tuberculosis accompanies the excretory dyes, all organic iodide compounds.

At the Seaview Hospital, New York City's Municipal Hospital for all types of tuberculosis, particularly advanced cases, excretory urography has been employed for the last six years in tuberculous patients requiring urologic investigation. Because of the poor physical condition of many patients, this method has in many cases been found more desirable than manipulative procedures such as cystoscopy. The patients at this institution have often related to other patients stories of the unavoidable pain following manipulative procedures. As a result, some patients have refused to permit anything but intravenous methods for diagnosis of their renal lesions. No serious reactions from excretory urography have been noted during the past six years that it has been used at Seaview Hospital.

We have reviewed 230 studies with excretory urography performed on 217 patients during 1938. In this group were males and females of all races; their ages ranged from 6 to 77 years. Most of the patients suffered from pulmonary tuberculosis. A considerable number had bone lesions and a few exhibited uro-genital tuberculosis without evidence of active disease elsewhere. This last group included several patients who had been admitted following nephrectomy for tuberculosis but in whom tuberculous sinuses persisted or other evidence of the disease still afflicted the remaining kidney. There were three non-tuberculous patients in this group. They had been admitted from general hospitals under an erroneous diagnosis.

Among the complications noted in these patients who underwent excretory urographic studies were heart disease, arteriosclerosis, hypertension, diabetes, amyloidosis and pregnancy. Some patients were undergoing surgical treatment, such as pneumothorax or thoracoplasty, for pulmonary tuberculosis, and still others were being treated for orthopedic lesions.

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No changes in the pulmonary status of these patients could be attributed to the administration of urographic dyes. Ten patients who were examined before and after excretory urographies showed no change in auscultatory or roentgenographic findings. Twelve patients, whose sputum became negative for tubercle bacilli in the six months before urographic examination, were still found to have negative sputa for at least six months afterwards. These findings are confirmed by the experience of Thomas, who observed no serious reactions following a great number of excretory urographic studies of tuberculous patients at Glen Lake Sanatorium (Minnesota). We have made a detailed analysis of the results and reactions observed in the last 100 patients on whom excretory urographies have been employed. Most of these patients were suffering from moderate to far advanced pulmonary lesions. However only a very few suffered disagreeable symptoms following the intravenous administration of these urographic dyes. The reactions were all of a minor and temporary character and varied with the type of dye used.

Neo-Iopax was well-tolerated. Only an occasional patient complained of general warmth during the injection or of a transitory cramp in the vein at the site of injection. These pains, radiating toward the shoulder, were easily relieved by mixing the venous blood with the dye in the syringe during the administration. No gastrointestinal symptoms or urticarial manifestations followed the use of this preparation.

Diodrast, used in many patients, also proved satisfactory. Nausea was the most common disagreeable feature. A number of patients vomited, had transient coughing spells, or noted a tightness or choking sensation about the throat and retrosternal region. A few patients complained of a feeling of general warmth but only one developed a generalized urticaria, which responded immediately to epinephrine given hypodermically. Pain in the arm and shoulder was not a common complaint when this dye was used.

Diodrast Compound was used on only a few patients. The urographic results were excellent but several patients developed urticarial reactions and others suffered gastrointestinal upsets.

TECHNIC OF EXCRETORY UROGRAPHY

Preparation of a patient before excretory urography must be carefully followed through. The patient receives a laxative, such as Compound Licorice Powder (the adult

dose is three drams), at 6 P. M. on the evening before the urographic studies are to be made. After 8 P. M., he receives no more food or fluids until the studies have been completed. A soap sud enema is given early the next morning, especial care being taken not to introduce air into the large bowel.

If the patient has been in bed for a long time or has been in the custom of receiving sedatives at bedtime for a prolonged period, additional thorough cleansing is necessary to eliminate gas retention in the bowel. We tried Pitressin or Prostigmine for one month, since these drugs have been reported to be effective in eliminating gas in the bowel. Although no serious reactions were encountered, some patients complained of marked discomfort and became alarmed following the administration of these drugs.

On the next morning, appropriate amounts of the organic iodide dyes (20 cc. for an adult) are administered intravenously. The time required for injection is from 3 to 4 minutes. Patients with active pulmonary lesions should be masked if they cough. Should spine or hip lesions be present, the suprapubic compression bag must be applied with caution.

The roentgenographic films are taken 10, 20 and 60 minutes after the administration of the dye. We believe that one of these pictures should be taken in the Trendelenberg position and another in the exaggerated Fowler's position. However, many patients with pulmonary disease complain of difficulty in breathing when they are placed in the Trendelenberg position.

DISCUSSION

The objection to the use of organic iodide dyes in tuberculosis patients has depended upon several theoretical considerations. In the first place, the permanence of the iodine linkage in the organic combination is not known. Hence the amount of free iodine in the body which might be found after intravenous administration of the dye has not been determined. The objection to using inorganic or free iodine in tuberculous patients is that this drug is known (1) to change the character of the sputum and is assumed (2) to precipitate the breakdown of healing scar tissue in tuberculous lesions. It has been thought that the usual thick mucoid bronchial secretions envelop and eliminate free tubercle bacilli which might otherwise reinoculate uninvolved portions of the pulmonary tree. It has been suggested by Ornstein that the profuse expectoration following iodide administration dangerously and unnecessarily dilutes the mucoid sputum.

Since severe reactions have occasionally been reported following injection of organic iodide dyes, caution, perhaps unwarranted, has been responsible for establishing the concept that these dyes were contraindicated in debilitated patients.

We have found no evidence to contraindicate the use of the excretory method or urography with organic iodide dyes in tuberculous debilitated patients. In the first place, the amount of iodine in any single injection dose of the common intravenous dyes varies between 4.5 and 7.5 grams. In the presence of even fairly adequate kidney function, most of it will be excreted and only a very small amount may theoretically become free iodine.

The roentgen films taken in our excretory urographic studies of tuberculous patients were no less satisfactory than those taken of non-tuberculous patients. Obviously, excretory films are not as definite in urinary tract outline as retrograde studies. However if patients cannot be catheterized because of a necrotic tuberculous bladder, or because of the presence of a tuberculous ureteral obstruction, excretory films give adequate anatomic information.

SUMMARY AND CONCLUSIONS

Excretory urography, employing organic iodide dyes, has been employed in all types of tuberculous and debilitated patients at Seaview Hospital for the past six years. No serious reactions have occurred.

An analysis has been made of the reactions occurring in 100 tuberculous (pulmonary tuberculosis) patients studied with excretory urography during 1938. Only minor and transient reactions were noted following the administration of organic iodide dyes.

Tuberculosis is no contraindication to excretory urography.

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A Study of Physical Examination Records in Use in Health Services*

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In an attempt to determine the possibility of arriving at some uniformity of content of the physical examination records now in use in college health services, a letter and questionnaire were sent to every college having membership in the American Student Health Association. The letter solicited frank opinion on the value of the survey and outlined the project. We suggested the possibility of formulating a type of physical examination record that might be adaptable to various types of health services as follows:

1. Those depending upon a school nurse and members of the physical education staff to make the physical examination (this examination to include such items as measurements, posture, vision, hearing tests, etc.),
2. Those with a part-time physician staff or insufficient physician and laboratory facilities to give a comprehensive physical examination, and
3. Those with adequate physician and laboratory staff, including specialists.

In working toward this type of a record we would not lose sight of the fact that the only entirely satisfactory examination is a complete one done by a physician staff and followed by laboratory tests as indicated. On the other hand, we recognize the fact that a limited examination is of more value than no examination at all. In this case the examiners must recognize their limitations, and not give the impression that a rapid physical survey fills the requirements for a complete examination.

The increasing demand for certificates of physical fitness emphasizes the importance of establishing accurate and useful tests. For example, the ordinary physical examination of the chest, without X-ray and tuberculin test, does not warrant the examiner's stating that the patient is free from pulmonary disease. Nor should we tag a patient with a diagnosis of valvular heart disease on the basis of stethoscopic examination alone.

At the time of tabulation of returns on the questionnaires December 22nd, we had received 101 replies to 140 letters sent.* One hundred schools sent copies of their records, and these records have been arranged for display. We take this opportunity to thank those who coöperated in the survey by returning the questionnaire, by expressing their opinions in letters and by sending copies of their records.

Opinions as to the value of the survey and the desirability of establishing uniform content of the physical examination record were varied. Many writers were outspokenly against any form of standardization or "regimentation". Attention was directed to a previous survey made by another group (American Physical Education Association), and to the slow response to adopt the outline for routine physical examinations proposed by the American Medical Association. One writer brought up the problem of the value of minute examinations in relation to the time and money involved. Another large group replied that they were not satisfied with their present records or were considering a change in the records now in use and would welcome a study of the problem.

Detailed replies to the questionnaire are given below:

1. Do you believe there is sufficient need for uniform physical examination records to warrant a study by the American Student Health Association?

Yes	73%
No	11
Doubtful	14
No reply	2

2. Do you believe practical the suggestion to work out a standard physical examination record adaptable to schools having:

   a. No physician staff (only school nurse and physical education staff):

Yes	63%
No	23
Doubtful	8
No reply	6

   b. Limited physician staff:

Yes	74%
No	6
Doubtful	17
No reply	3

   c. Complete physician and laboratory staff:

Yes	76%
No	8
Doubtful	13
No reply	3

3. Following the classification in question 2 what routine laboratory tests should be included under Part II:

Urinalysis	76%
Hemoglobin	15
Blood count	9

   Part III:

Urinalysis	81%
Hemoglobin	34
Blood count	27
Blood chemistry	3
Serology	1

4. Following the classification in question 2 what other diagnostic tests should be included under Part II:

Tuberculin test	67%
Wassermann test	27
Schick test	15
Dick test	11

   Part III:

Tuberculin test	84%
Wassermann test	64
Schick test	37
Dick test	32

5. Following the classification in question 2 what X-ray examinations should be included in Part II:

Chest X-ray	71%
Fluoroscopy, chest	2
X-ray teeth	1

   Part III:

X-ray chest	83%
Chest fluoroscopy	4
X-ray teeth	1

In response to the request to check on a copy of their physical examination record the items that would be classified under Part I, Part II and Part III of the examination, only fifteen records were so divided. From this relatively small amount of data, and the data given on the questionnaires the following items are grouped under the three main headings, and represent roughly the points to be covered in the various types of examination. Each item in these lists was agreed upon by approximately half, or more, of those replying to the questions.

Part I—(Examining staff consisting of nurse and physical education faculty.): Age, height, weight, measurements, skeleton, posture, extremities, nutrition, skin, vision (Snellen), hearing (watch or voice), teeth.

*Several additional replies have been received since.

*Presented before the American Student Health Association, New York City, December 29, 1938.

†Health Service, University of Kansas.

Part II—(Limited physician and laboratory staff): Age, height, weight, measurements, skeleton, posture, extremities, nutrition, skin, vision (Snellen), ears: hearing (watch or voice), drum; teeth and gums, mouth and throat, nose, thyroid, heart: blood pressure, pulse; lungs: chest X-ray, tuberculin test; abdomen, genitalia, hernia, varicosities, neuro-muscular system, urinalysis.

Part III—(Complete laboratory and physician staff): Age, height, weight, measurements, skeleton, posture, extremities, nutrition, skin, eyes: vision, color vision, refraction, if indicated; ears: hearing (audiometer), drum; teeth and gums by dentist or dental hygienist, X-rays as indicated; mouth and throat; nose, including transillumination of sinuses; thyroid, including basal metabolism test, if indicated; heart: blood pressure, pulse, electrocardiogram and X-ray, as indicated; lungs: tuberculin test, chest X-ray; abdomen, genitalia, hernia, varicosities, neuro-muscular system, urinalysis, blood count, Wassermann test; Schick test, Dick test; (other tests as indicated).

CONCLUSIONS

1. A majority of the directors questioned indicated there is an opportunity for revision of physical examinations now in use in many schools to make them more nearly uniform in content.

2. There is lack of agreement as to the laboratory and diagnostic tests considered to be of value in the routine examination.

3. Local conditions and staff preferences govern largely the type and content of the records now in use.

4. If revision of physical examination records is undertaken, it should be along the lines of advising as to content of the record rather than the development of a standard form.

A Biometric Study of Sedative Medication*

Barnett Alpert, M.D.
Brooklyn, New York

IN view of the marked prevalence of sedative drugs in medical prescriptions, it might be well to consider and compare certain properties and characteristics of the major groups—the bromides and the barbiturates.*

Since it is almost impossible to test all of the bromides or barbiturate compounds, it was decided to select representative preparations of each of these two groups.*

Controlled animal experiments were performed with three objects in view:

First, to determine the minimum lethal dosage of the bromide as compared with that of the barbiturate.

Second, to determine the effects upon longevity and behavior of using multiples of both drugs continuously over periods corresponding to animal-man years.

Third, to determine whether susceptibility of animals to these drugs is increased or decreased by long continued medication with the same.

TOXICITY STUDIES

In the present experiments, a direct comparison was made of the minimum lethal dosage and toxicity of the bromide and the barbiturate, respectively, using rabbits and albino rats obtained from the same litters as the test animals. All animals were fed and housed under identical conditions. In all, 18 rabbits and 13 albino rats were used for this experiment.

*Neurosine was chosen to represent the bromides, and barbital the barbiturates. Neurosine was chosen for the investigation because of its very extensive use by physicians in symptomatic treatment of neurasthenia, hysteria, insomnia, epilepsy, alcoholism and menopausal neuroses. Neurosine contains approximately 30 grains each of sodium, potassium, and ammonium bromide together with three fifths grain of zinc bromide, supplemented by small quantities of the therapeutic adjuvants belladonna, henbane and lupulus and laxative cascara sagrada.

Barbital is considered to be the most important of the barbiturates. Not only is it the first of these substances used and still widely employed in medicine, but it is also the substance from which the other barbiturates are derived. Barbital likewise serves as the basis of comparison of action, efficiency and dosage for its varied derivatives.

The therapeutic dose of the barbiturate is 0.0047 gram per kilo of body weight. This is computed from the U. S. P. dose on the basis of animal weight. For the rabbits the weighed amount of the barbiturate, in the multiple of the therapeutic dose desired, was placed in gelatine No. 0 capsules and forced down the esophagus by means of a glass rod.

The therapeutic dose of the bromide for rabbits was computed on the basis of the recommended dose (2 drams) for man. A dessertspoonful or 8 cc. per 70 kilo man corresponds to 0.114 cc. per kilo. Thus 0.114 cc. per kilo was used as the therapeutic dose for the rabbit. The measured amount of the bromide, in the needed dosage multiple, was introduced by a syringe through a No. 14 French catheter, directly into the stomach.

From these data it was found that the minimal lethal dose of the barbiturate for rabbits is 0.24 grain per kilo of body weight or 50X the therapeutic dose. This corresponds to 16.3 grams for a man weighing 150 pounds. The minimal lethal dose for rabbits of the bromide was found to be 6.8 cc. per kilo of body weight or 60X the therapeutic dose. This corresponds to 462 cc. for a man weighing 150 pounds.

A similar series of comparative toxicity tests was made by using albino rats. A measured amount of the barbiturate was agitated in water and introduced by a glass syringe through a No. 10 French (rubber) catheter directly into the stomach. In a like manner measured amounts of the bromide were administered.

From these studies it was determined that the minimal lethal dose of the barbiturate for albino rats is 0.188 gram per kilo or 40X the therapeutic dose, corresponding to 12.3 grams for a man weighing 150 pounds. The minimal lethal dose of the bromide for albino rats was

found to be 9.1 cc. per kilo or 80X the therapeutic dose, equivalent to 619 cc. for a man of 150 pounds.

LONGEVITY TESTS

A study was made of the effects of long continued medication with the barbiturate and the bromide, respectively, as compared with control animals receiving no medication. For this purpose rabbits and albino rats were observed over periods of weeks corresponding to human years on the basis of comparative longevity. Identical multiples of the therapeutic doses of both drugs were used. Observations were made upon longevity, behavior, activity and weight changes.

One year of a rat's life is equivalent to thirty years in a man's life. Its period of growth extends over approximately 300 days, its life span being about three years. Thus rats live their cycle at approximately 30 times the rate of the human species. The rats were observed for a period of ten weeks or approximately six man-rat years.

Similarly, one year in a rabbit's life is equivalent to ten years in a man's. The rabbits were observed for a period of ten weeks or approximately two man-rabbit years.

Rabbits and albino rats were used for these experiments. Animals from the same litters were divided proportionately among the experimental and control groups. The animals were kept in separate wire-mesh metal cages. The temperature, humidity and fresh circulation of air were kept constant by means of a vacuum pump. Cages were changed and fresh paper was placed on the floor twice daily.

The reaction of rabbits and rats to continued medication with 2X and 5X the therapeutic doses of the bromide and the barbiturate was studied. For this experiment, 23 rabbits and 72 rats were used.

A special solution of the barbiturate or the bromide was made for each rabbit or rat. This was calculated so that a convenient and uniform amount, such as 3 cc. for example, could be administered three times daily. The factors used in the calculation included the multiple of the therapeutic dose and the animals' weight, so as to make up the proper dilution.

Both the bromide and the barbiturate were administered in the same manner in all animals. The measured amount of solution was drawn into a graduated glass pipette with a rubber bulb at one end. The pipette was slipped down the animal's throat to the esophagus and emptied.

Comparing the two groups of rabbits treated with 2X the therapeutic dose of the barbiturate and the bromide respectively, it will be noted that none of the four barbiturate-treated rabbits lived longer than three weeks, while three of the four bromide-treated rabbits were alive at the conclusion of the experiment after ten weeks (equivalent to two man-rabbit years).

Comparison of the two groups treated with 5X the therapeutic dose of the barbiturate and the bromide, respectively, shows that the survival records were definitely better in the bromide-treated group. However, one of the barbiturate-treated rabbits survived the entire period of ten weeks. This animal showed an unusual degree of resistance to the barbiturates. It was the only animal surviving longer than two weeks.

SURVIVAL INDEX OF RABBITS

The *survival index* affords a mathematical expression of the effect of the barbiturate and the bromide medication, respectively, upon longevity. It expresses, in terms of percentage, the number of animal-weeks survived as compared with the sum total of weeks which would be possible if all animals survived the entire experiment. A correction factor is applied on the longevity record of the controls, so that each survival index computed compares the record of the group under consideration with that of the controls.

The survival index of the five groups of rabbits is as follows:

Controls (correction factor)	87%
2X barbiturate-treated (corrected)	23%
2X bromide-treated (corrected)	92%
5X barbiturate-treated (corrected)	40%
5X bromide-treated (corrected)	66%

There was a striking difference in the behavior of the barbiturate-treated animals as compared with those of the bromide-treated groups. The latter had stronger muscular tonus and better posture and took better care of their skin and fur. The activity of the animals was observed closely throughout the period of observation.

The 2X bromide group showed slight reduction of activity as compared with the controls, and their activity was much greater than that of the 2X barbiturate group. The 5X bromide group also proved much more active than the 5X barbiturate group. The activity of the 5X bromide animals was likewise greater than that of the 2X barbiturate group after the first two weeks. The level of activity in the 5X barbiturate group was maintained by the single survivor, who seemed to possess an abnormal degree of resistance to the barbiturate.

The animals were weighed daily. This was a necessary factor in computing the dosage, which was based on the animal's weight. Since the weight changes afforded no information of scientific importance, they are omitted from this report.

SURVIVAL INDEX OF RATS

As in the case of rabbits, the survival index was determined in the five groups of albino rats.

Comparing the two groups of rats treated with 2X the therapeutic doses of the barbiturate and the bromide, respectively, six of the twelve rats survived the ten weeks' period in each case. However, the longevity record of the barbiturate-treated group was rather better in this comparison, as will be shown by the survival index.

Comparing the two groups of rats treated with 5X the therapeutic dose of the barbiturate and the bromide, respectively, seven of the twelve bromide-treated rats survived the ten weeks' period as compared with two for the barbiturate-treated group. Furthermore, the

longevity record of the bromide-treated group was decidedly better as will be shown by the survival indices.

The survival index of the five groups of albino rats is as follows:

Controls (no correction factor needed)	100%
2X barbiturate-treated	79%
2X bromide-treated	62%
5X barbiturate-treated	28%
5X bromide-treated	81%

The survival index and longevity record were definitely better in the 5X bromide-treated rats than in the 2Xbromide-treated group. This was paralleled by the greater physical activity of the animals in the former group. This apparent discrepancy is readily explained by the general occurrence of diarrhea in the animals of the 5X bromide-treated group, due to the laxative content of the preparation. This diarrhea apparently served as a safety factor against lethal intoxication by eliminating excess medication from the intestinal tract.

There was a striking difference in the behavior of the barbiturate-treated animals as compared with those of the bromide-treated group. The latter had strong muscular tonus, better posture and took better care of their skin and fur. The activity of the animals was watched closely throughout the period of observation.

The 2X barbiturate group showed least reduction of activity, while the 5X barbiturate showed the greatest reduction. The 5X bromide group showed less reduction of physical activity than the 2X bromide group. This apparent inconsistency would appear to be due to occurrence of diarrhea in the 5X group, which not only caused evacuation of excess medication but also kept the animals more active looking for food.

The animals were weighed daily, as was required for computation of the dosage. From the standpoint of comparison, the weight changes were not regarded as significant and are therefore omitted from this report.

EFFECTS OF PROLONGED USE ON SUSCEPTIBILITY

Additional experiments were performed to determine whether the animals surviving the longevity experiments had increased or decreased their susceptibility to the drugs previously administered.

There were five surviving rabbits. After the tenth week, these animals were kept without medication for one week. Respective treatments were then resumed for one week and all rabbits acted, to all intents and purposes, the same as the normal control animals. Apparently they had developed immunity to the identical dosage of the drug. During the week without medication the animals acted much the same as during the last week of treatment.

There were 21 surviving rats, which were kept without medication for two weeks. The 2X bromide survivors recovered from the depression induced by prolonged medication faster and more completely than the 2X barbiturate survivors. The 5X bromide survivors likewise recovered from their depression, while the 5X barbiturate survivors failed to regain normal activity and behavior. After the two weeks' rest, all the rats were again placed on their respective medication. There was slowing up of activity and the animals became as quiet and depressed as in the first experiment.

All the rabbits and eleven of the rats were then used for further experiments on minimal lethal dosage. The findings in these experiments were recorded. Autopsies showed no lesions in the vital organs of any of the animals. A 2X barbiturate rat survived 60X the therapeutic dose and a 5X barbiturate rat survived 120X the therapeutic dose, indicating increased tolerance due to habituation. In the case of rabbits, although all of them showed reduced susceptibility to the barbiturate and the bromide, respectively, so far as their behavior was concerned, the experiments failed to establish evidence that the minimum lethal dose was affected materially by the prolonged period of treatment.

CONCLUSION

The widespread use of sedative drugs has prompted this investigation and comparison of bromides* and barbiturates.** From the evidence gathered it would appear that the bromides are far preferable to barbiturates for inducing sedation because:

1. The margin of safety between the therapeutic and minimal lethal doses of the bromide is greater than that of the barbiturate.

2. After long-continued medication the bromide affects longevity much less than the barbiturate.

3. Recovery is more rapid and complete after the bromide than after barbiturate administration.

4. The bromide does not produce tolerance or habit formation, a known and proven danger factor in the use of barbiturates.

*Neurosine was chosen to represent the bromides.
**Barbital was chosen to represent the barbiturates.

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THERAPEUTIC PROGRESS

Detail men who call at physicians' offices have a way of stimulating meditative thought. Sometimes it is of a destructive and at other times of a constructive nature. Like the workings of metabolism, it should be both—or shall we say a little of each. It is impossible to specify the relative proportions. Mental metabolism must determine that. This calls for an analytical mind—one that can choose with wisdom what to eliminate and what to adopt. We must not only decide what to adopt, but we must also decide what, if anything, that which we adopt shall replace.

We have been told about the marvels and dangers of the sulfanilamide preparations. We learned about insulin but soon discovered that the protamine zinc preparation had the advantage by reason of a more lasting effect. We have been made well-nigh dizzy by the acrobatic antics of the carbon and hydrogen atoms in the benzene ring. New and fantastic names have been emblazoned upon the therapeutic heavens, as envisioned through the portable telescopes of traveling representatives of pharmaceutical houses.

We are living in an age of wonders, but sitting in a golden chair involves responsibility. As judges, we must listen to these representatives' stories; we must patiently listen to all of them and decide what to accept and what to reject. Lest we forget the virtues of Dover's powder, aconite, calomel, and sweet spirits of niter, we might take a little time out to bow our heads in grateful remembrance of the many times they have served us in the past. Are they all really so very obsolete?

A. E. H.

"THE FAMILY PHYSICIAN VANISHING IN THE CITY"

Such is the heading and editorial in an Eastern newspaper, with reference to New York City, based on a research report made by a Miss Swackhamer at the expense of the Committee on Research in Medical Economics. One of the issues involved in this work was to arrive at the relative value of the so-called *free choice*

of physicians, a slogan about which we are hearing very much today. It appears also that this Committee is very much concerned as to the apparent necessity of families being guided by outside agencies, as to the proper places to go and as to the best means of ascertaining what physicians to patronize for medical care in general. (To some of us it would hardly seem possible that in these modern years, many families are so poorly informed along these lines they must seek social and other uplift workers to lead them, psalmody-like, into pleasant lands and to suitable doctors.)

In this research Miss Swackhamer studied three hundred and sixty-five families in New York City proper, having annual incomes as follows: 32 per cent with incomes up to $1,000.00; 49 per cent up to $1,999.00; 14 per cent from $2,000.00 up to $2,999.00; 5 per cent more than $3,000.00. "The family doctor is a vanishing ideal among two-thirds of these families, and he is very imperfectly represented among the remaining one-third." (This rather confirms the statements by general practitioners and members of some clinics, that the old-time contact and adherence of individuals and families to the individual physician and the clinics is an affair of the past, never to return.) The Committee, in concluding the report, adds the following: "The study puts the proof of the burden on those who make shibboleths of free choice and personal relationship with physician without looking to see how far these essential principles are actually effective under existing conditions of private medical practice."

While in the smaller towns the general practitioner reigns practically supreme, yet even there changed conditions and vastly improved means of transportation, with the attendant competition of the larger cities, add to the problems. In these latter places, the competition of the older organized profession sometimes induces the newer but perplexed practitioners in turn to form medical groups, and thus add to the widening list of specialists. At intervals something like the following broadside appears, even in the *Journal of the American Medical Association,* which has in the past years intimated that a large percentage of medical practice could be taken care of by the general practitioner:

> "Unless the prospective mother," the speaker stated, "can be impressed with the importance of an early choice of a skillful and conscientious physician, and it is made possible for her to choose a physician *from among the most competent obstetricians in the community,* and unless it is made possible for those in the lower economic levels to obtain adequate medical, nursing and hospital care, a material reduction in maternal mortaliy rates cannot be expected."

With all due consideration for the exceeding fervor of the writer of the preceding quotation, it may also be considered, from another angle, as a decided indictment of the deans of the medical colleges and of the hospital staffs, all interested in and supposed to give excellent training to their students and to their interns, sent out into the world as general practitioners. A fairly recent graduating oration well illustrated, for the public, this general belief that the family physician is moving out of the picture: The speaker climaxed his oratorical flight in substance as follows: "What, then will become of the general practitioner? He will be an intelligent, cultured gentleman, who will stand by the roadside; who does not practice whatsoever; but who will act as an advisor-at-large for the questioning public; and who will direct wisely and courageously all those seeking medical aid."*

Another orator, completing his address, exclaimed: "Go Forward, and God Bless You." With this forceful command and with this helpful benediction, we must leave the young doctor to his Pilgrim's Progress.

A. W. S.

*From The Diplomate.

MEAT INSPECTION

Meats were for a long time the source of much disease among human beings in various parts of the world. Dr. Mohler, Chief of the Bureau of Animal Industry, has called attention to the fact that there are seven diseases transmissible from cattle to man, namely, tuberculosis, anthrax, contagious abortion, hoof and mouth disease, rabies, cow-pox, and actinomycosis. There is also one parasite—the beef tape-worm. There are also diseases of other animals such as trichinosis which may constitute a serious problem in the human family.

The first legislation providing for meat inspection was passed by the Congress of the United States in 1890. The first phase of inspection pertained to dressed beef for export. Next came the microscopic examination of the muscle of hogs for trichina. This was so reassuring to foreign countries that Denmark, Austria, France, Italy, and Germany removed the ban which had been placed on importation of pork from America.

Before the days of Federal meat inspection, animals being taken to market for slaughter were known to have fallen on the highway and could not rise because of weakness from disease. Those found dead in cars on arrival, as well as those which had received broken bones through shipment were still sold for human food.

Today the Division of Federal Meat Inspection, under the Chiefship of Dr. E. C. Joss of the Bureau of Animal Industry, constitutes the largest service of this kind in the entire world. It employs 836 highly trained veterinarians engaged in Federal meat inspection. There are also 1,471 lay inspectors especially trained to assist in this work and twenty-one experts in chemistry, pathology, and other laboratory work.

In 1938 the carcasses of approximately 66,000,000 animals, including cattle, sheep, goats and horses, were inspected. More than 23,000 were condemned on antemortem examination and on postmortem examination 202,000 were condemned to the rendering tanks.

The Division of Meat Inspection also certifies meat for export and inspects meats offered for entry into the United States. For example, in 1938 more than 43,000,000 pounds from Argentina passed Federal inspection but nearly all of this was in the form of canned or cured meats. During the same year, 2,000,000 pounds of meat

from various countries was refused entry into this nation because of unsoundness, mis-labeling, defective canning, presence of prohibitive preservatives, etc.

The present cost of Federal meat inspection, which is paid by taxation, is one cent for each fifty pounds. On a per capita basis this amounts to three to four cents a person per year.

An unfortunate fact is that our Federal meat inspection applies to only two-thirds of the animals slaughtered in this country. The present laws exempt from inspection meats butchered by farmers, local butchers, and meat dealers who make only interstate shipments in serving their own customers; in other words, one-third of the meat consumed in this country is not inspected and, therefore, very bad situations may exist with reference to the slaughter of animals known to be definitely diseased, as well as those which have disease unsuspected during life. It is unfortunate that our present laws do not provide for inspection of all meat in each state. Even animals slaughtered by farmers for family consumption should be inspected by trained veterinarians and such inspection should apply to local butchers and all who place meats on the market.

With so much that is known about the dangers of meat foods that are not properly inspected, it seems almost unbelievable that we as a people should allow one-third of all meats to be consumed in this nation without inspection. For more than fifty years the veterinarians of this country have put forth much effort to bring about the best possible arrangement for inspection of meats. Every physician can help in his community by supporting the veterinarians and encouraging the enactment of laws which will guarantee adequate inspection of all meats.

J. A. M.

Book Reviews

Failure of Circulation, by TINSLEY RANDOLPH HARRISON, M.D., associate professor of medicine, Vanderbilt University School of Medicine, Nashville, Tenn.; second edition, 502 pages, cloth; Baltimore: Williams & Wilkins Company: 1939. Price, $4.50.

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The mechanism of heart failure has always presented a problem that is confusing to the student, the clinician and the research worker. Although many phases of this important subject still remain unexplored, a great deal of precise information has been accumulated within recent years. Not a little of the clarification of this complex subject is being accomplished by the author of this most valuable volume. The first edition appeared nearly four years ago and in this second edition much new material has been added. Extensively revised are the chapters on angina pectoris, cardiac syncope and cardiac collapse. He presents in this volume the results of his own extensive researches together with those gleaned from the voluminous literature dealing with this subject. The subject matter is presented in an engrossingly interesting manner. The author has the rare ability of presenting difficult and involved concepts in simple and understandable language. He has further facilitated the clarity of the presentation by using very graphic charts, illustrations and concise resumes. The reader is actually able to visualize the devious mechanisms by which congestive heart failure takes place and to perceive how this gradually brings about the symptom-complexes of exertional dyspnea, orthopnea, nocturnal dyspnea, cardiac asthma and other allied symptoms often so distressing to the patient. Rarely does one find the pathogenesis of patients' complaints so clearly discussed. There are also many valuable suggestions as to treatment of heart failure and its symptoms.

A striking example of how the author helps visualize the pathological physiology is to be found in Chapter IX, a brief chapter of nine pages, which gives a concise statement of the dynamics of the present day accepted "back pressure" or "backward failure" theory of heart failure. He cites here a most illuminating example to illustrate how the failing heart can still provide a normal minute-volume output while the organ is becoming progressively weaker and less efficient.

The inclusion of this book in one's "must read" group will bring a great deal of pleasure and help to anyone who has frequent contact with cases of heart disease. The reviewer can recommend very highly the value of this book and the importance of its place in the library of anyone interested in the subject of heart disease.

Trauma and Internal Disease, by FRANK W. SPICER, A.B., M.D., F.A.C.P.; 593 pages, 43 illustrations; Philadelphia: J. B. Lippincott Company, 1939. Price, $7.00.

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Trauma and Internal Disease is a medical treatise which may be used as a basis for medical and legal evaluations of the etiology, pathology, or clinical processes following injury. Its writing was prompted by the medical problems which daily arise in the various courts of law relative to the causation and aggravation of disease by injury. Trauma and its relation to each bodily tissue is separately considered, and even some of the medical specialties are broken down into their subdivisions. A medicolegal viewpoint is focused on each subject.

Even though nothing new medically may be obtained by the specialist or general practitioner from this volume, a very fresh medicolegal aspect of all medical traumatic conditions is very well developed. Both the practitioner and the specialist will be able to use this volume to their advantage, especially if any of their medical problems are involved in court procedure.

Outline of Roentgen Diagnosis: An Orientation in the Basic Principles of Diagnosis by the Roentgen Method, by LEO G. RIGLER, M.D., professor of radiology, University of Minnesota, Minneapolis. Atlas edition, cloth; 212 pages with 254 illustrations shown in 227 figures, presented in drawings and reproduction of roentgenograms; price, $6.50. Student's edition (exclusive of atlas), paper; 212 pages; price, $3.00. Philadelphia, New York, Montreal and London: J. B. Lippincott Company, 1938.

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If it is possible to master the specialty of X-ray from a single book, this book should accomplish that. If it is impossible, at least the reader can obtain a great deal of valuable information in the fields of anatomy, physiology and internal medicine. This is not only a volume on static photography but a book on the dynamics of visual diagnosis.

In the general discussion and in the summary of each chapter, the author reveals his broad and scholarly attitude towards his specialty. To him, the X-ray method of diagnosis is only one of many. He warns that it is not the only and final word in all cases—that while its value in certain diseases cannot be over emphasized—in other instances its use is limited.

The author has pointed his efforts to the selection of essentials for the general practitioner. The result is a precise, clear exposition of that part of clinical radiology which he believes the general practitioner can use in his daily work.

The work appears in two editions: one with illustrations, and the other, minus the plates but containing the same text. The plates in the complete edition are excellent. Figures 6 to 51 and 55 to 72 are drawings in an original technic by Jean E. Hirsch.

News Items

Dr. W. J. Butler, state veterinarian, was elected president of the Montana Public Health association at the annual session held in Butte, June 27, 1939.

Dr. Edward Parnall, formerly of Rochester, New York, has joined the Northwest Clinic staff of Minot, North Dakota, as an orthopedic surgeon.

The American Association for the Study of Goiter at its annual meeting recently voted to hold its convention next year in Rochester, Minnesota. Dr. Frank Rogers, Denver, was named president-elect for 1940-41.

Dr. James A. Johnson, Minneapolis, has been named president-elect of the Hennepin County medical society. He will take office in October. Other officers are Dr. Russell W. Morse, first vice-president, and Dr. William R. Jones, second vice-president. Named to elective committee posts are Dr. Ernest L. Meland and Dr. Stephen H. Baxter, executive committee; Dr. Douglas P. Head and Dr. Robert L. Wilder, board of censors, and Dr. Thomas J. Kinsella and Dr. Martin Nordland, ethics committee.

Six Montana counties have been re-accredited as modified cattle tuberculosis-free areas. Dr. G. W. Cronen, inspector in charge of the Montana office of the U. S. Bureau of Animal Industry, announced counties re-accredited for a three-year period effective June 1 included Deer Lodge, Granite, Liberty, Ravalli, Sheridan and Toole.

Dr. Milo H. Larson, formerly of Nicollet, Minnesota, is now practicing in Mankato.

Dr. L. F. Leitschuh, a graduate of the University of Minnesota Medical School, 1937, has become associated with Dr. J. A. Malerich at Shakopee hospital, Minnesota.

Dr. John C. Mickelson, graduate of the University of Minnesota Medical School who interned at Jersey City Medical Center the past year, has joined the staff of the Mankato, Minnesota, clinic as general practitioner and obstetrician.

Dr. Theodore P. Mollers of Cloquet is now practicing in Mazeppa, Minnesota.

Dr. Horace Newhart, Minneapolis, was elected president of the American Otological society at its seventy-second annual meeting at Rye, New York. This is the oldest society of its kind in the world.

Dr. John G. Lamont, Minneapolis, has been appointed superintendent of the Grafton, North Dakota, State School for the Feeble Minded by the North Dakota board of administration. Dr. Lamont headed the state tuberculosis sanatorium at Dunseith for 16 years. He resigned in 1929 to join the staff of Nopeming hospital and in 1935 came to Minneapolis to do clinical work. He succeeds Dr. Frank Deason who resigned, at Grafton.

At the meeting of the Great Northern Railway Surgeons' Association held in Glacier Park, July 1, 1939, the following officers were elected: Dr. D. S. MacKenzie, Sr., Havre, Montana, president; Dr. W. L. Kell, Columbia Falls, Montana, first vice-president; Dr. H. E. Cleveland, Burlington, Washington, second vice-president; Dr. A. C. Baker, Fergus Falls, Minnesota, third vice-president; Dr. R. C. Webb, Minneapolis, secretary-treasurer.

The cornerstone of the new $325,000 St. John's hospital at Helena, Montana, was laid June 24, 1939.

Dr. Donald L. Peterson who has held a surgical fellowship for the past four years at the Mayo clinic, Rochester, has become associated with Dr. W. G. Brown of Fargo, North Dakota.

The indictment charging the American Medical Association and 21 prominent physicians with violating the anti-trust laws, was dismissed in federal court July 26. Justice James M. Proctor ruled that medicine is not a trade, but a learned profession, and therefore that the defendants could not be guilty of restraint of trade in their alleged activities against Group Health Association, Inc., a coöperative set-up to afford medical care on a pre-paid basis to federal employees in the District of Columbia.

Dr. F. J. Fischer of St. Paul is now associated with Dr. A. K. Stratte in Pine City, Minnesota.

The University of Minnesota Medical School will observe its fiftieth anniversary with a three day celebration, October 12, 13 and 14. Outstanding men of medical science will come to Minnesota to take part in the activities, some festive, some serious. Dr. Harold S. Diehl, dean of the medical school, and Dr. Owen H. Wangensteen, chairman of the celebration committee, head the list of University faculty making preparations for the event.

Dr. Thor Moeller, Munich, North Dakota, has moved to Maddock where he has taken over the practice of his brother, the late Dr. J. H. Moeller.

Dr. C. E. Waldorf, Redfield, South Dakota, has been elected Spink county physician.

The School of Medical Sciences at the University of South Dakota, Vermillion, was approved by the Council on Medical Education and Hospitals of the American Medical Association at the meeting held in St. Louis, according to Dr. J. C. Ohlmacher, dean of the school.

Dr. Ira D. Clark, Sr., Fargo, North Dakota, has moved to Milnor. Dr. Ira D. Clark, Jr., also of Fargo, has become associated with Dr. H. W. Miller in Casselton.

Dr. James D. Morrison has joined his father, Dr. W. R. Morrison in Billings, Montana, and will limit his practice to diseases of the eye, ear, nose and throat. A graduate of the medical school of Washington University, the younger Dr. Morrison for the last two years has been resident eye surgeon in the Colorado General and University hospitals in Denver.

A permanent organization of the Rice County Chapter of the National Foundation for Infantile Paralysis was formed at a meeting recently in Faribault, Minnesota. Plans are now being made to carry out the program of the national organization within the county. Fifty per cent of the funds raised last January at the President's Birthday balls in Northfield and Faribault has been retained by the local chapter and the money will be available to assist infantile paralysis victims.

Necrology

LOUIS H. FLIGMAN, M.D.
1878-1939

Dr. Louis H. Fligman of Helena, Montana, passed away July 14, 1939. He was graduated from the University of Minnesota Medical School in 1901, and opened his office in Helena in 1902. He was one of the first physicians of that state to limit his practice to internal medicine. Dr. Fligman possessed a natural ability in his chosen field which he enhanced by frequent attendance in clinics both in the United States and abroad.

During the World War he was a Lieutenant Commander in the Naval Reserve Corps. He was a past president of the Medical Association of Montana and of the State Board of Health. At the time of his death, he was the Montana Governor of the American College of Physicians.

Dr. Fligman was a man who made a favorable impression on all who knew him and his manner inspired confidence. His many friends will feel his loss both personally and professionally.

J. B.

Dr. George A. Clauser, 74, Bridgewater, South Dakota, pioneer McCook county physician, died at his home June 27, 1939.

Dr. H. M. Finnerud, 80, one of the first physicians of Watertown, South Dakota, died July 10, 1939. He had taken an active part in many civic and private enterprises during his 49 years of residence in Watertown.

Dr. George McGrath, 73, pioneer physician of Hamilton, Montana, died June 21, 1939. A graduate of Queen's university, Toronto, Ontario, Dr. McGrath came to Hamilton in 1893.

Dr. James Alfred Watson, 71, of Minneapolis, Minnesota, died June 17, 1939. He had practiced in Minneapolis for 39 years and was a past president of the Minnesota Academy of Ophthalmology and Otolaryngology.

Dr. Eugene Silas Strout, 76, of Minneapolis, Minnesota, died June 25, 1939. Dr. Strout was a graduate of the University of Michigan and had lived in Minneapolis 45 years.

Dr. Elmer C. Hanson, 42, of Austin, Minnesota, died June 23, 1939.

Minnesota State Board of Medical Examiners

Julian F. DuBois, M.D., Secretary
St. Paul, Minnesota

DOCKET OF CASES

Jury Disagrees in Trial of Minneapolis Chiropractor

Re: STATE OF MINNESOTA *vs.* ARTHUR J. KOLLING

After deliberating more than 26 hours, a jury of nine women and three men, in the court of Judge Lars O. Rue of the Hennepin County district court, reported that it was unable to reach a verdict on the guilt or innocence of the defendant, Arthur J. Kolling, a Minneapolis chiropractor being tried on an indictment in which he was charged with practicing medicine without a license. The case was given to the jury at 3:30 o'clock p. m. on June 20, 1939, and at 6 o'clock p. m. the next day the jury was discharged by Judge Rue. It is reported that the jury was deadlocked 6 to 6. The case will be re-tried at the September term of Court.

The defendant, who is licensed to practice chiropractic in Minnesota and who owns the Hennepin Clinic at 805 La Salle Avenue, Minneapolis, was indicted by the Grand Jury on May 16, 1939, on a charge of practicing medicine without a license. The state introduced evidence at the trial that Kolling had sutured a wound of a 10 year old boy with surgical catgut. The boy had been injured by an automobile at 8th and La Salle and removed to the office of the defendant by the office assistant of the defendant. The accident happened at 4:15 o'clock p. m. on April 14, 1939. Despite the fact that the ambulance was called and that the accident occurred within one block of the Medical Arts Building, at a time when hundreds of medical men were available the case was described by counsel for the defendant as an "emergency". The parents of the boy called their family physician who promptly removed the boy to the hospital. On April 28th a statement for "services rendered" in the amount of $25.00 was sent on the stationery of the Hennepin Clinic.

Kolling did not take the witness stand in his own behalf but introduced testimony that the $25.00 charge was made to cover the damage done to his office and his equipment by the boy becoming nauseated, which he estimated at $10.00 and the balance of $15.00 to go to W. D. Hammond, M.D., for services. Dr. Hammond is registered with the Medical Board from 106 Washington Avenue South, which is the location of the Health Institute, specializing in "diseases of men." Dr. Hammond testified for the state and denied the boy was his patient and stated that the suturing was done by the defendant with catgut and surgical instruments owned by the defendant. Dr. Hammond's name appeared on the door of the Hennepin Clinic on that date but he testified that he had no arrangement with the defendant but was considering purchasing the place from Kolling. It also developed that the office assistant of the defendant is the wife of Dr. Hammond. Mrs. Hammond also testified for the state and stated that she was paid $5.00 per week for her services at the Hennepin Clinic.

Kolling was fined $150.00 in 1928 in the district court of Hennepin county following his plea of guilty to a charge of practicing medicine. He was also fined $2,000.00 in 1938 in United States District court following his plea of guilty to a charge of violating the internal revenue laws of the United States in connection with the alleged diversion of industrial alcohol. Kolling paid the fine and is on probation for three years on a suspended sentence of two years in prison in the same case.



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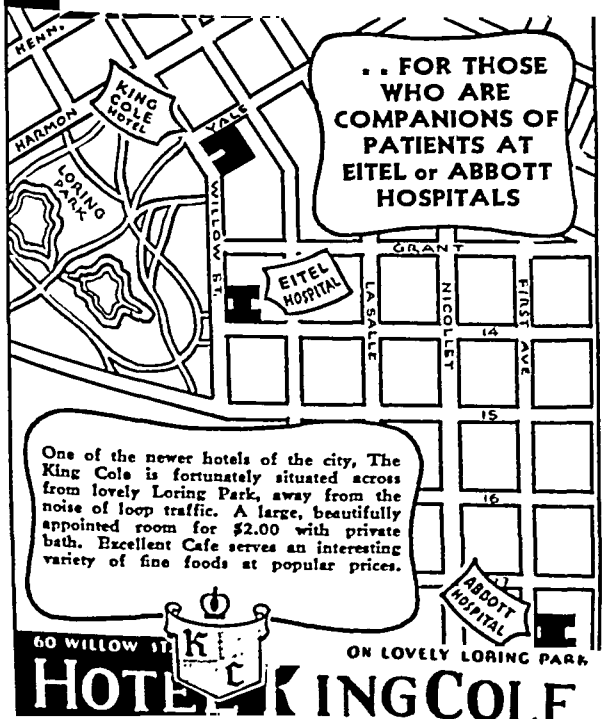
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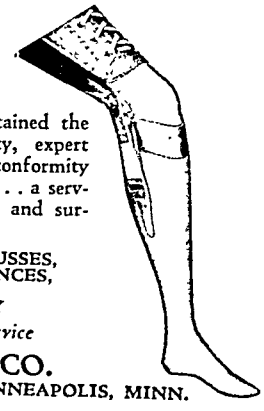


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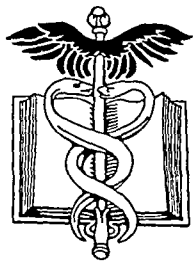


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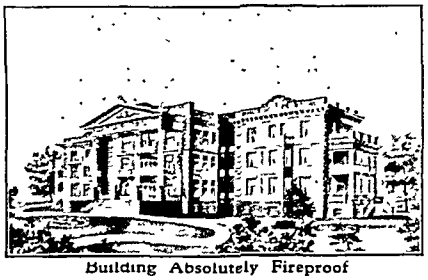
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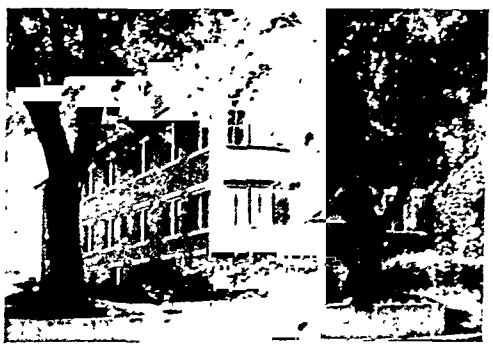
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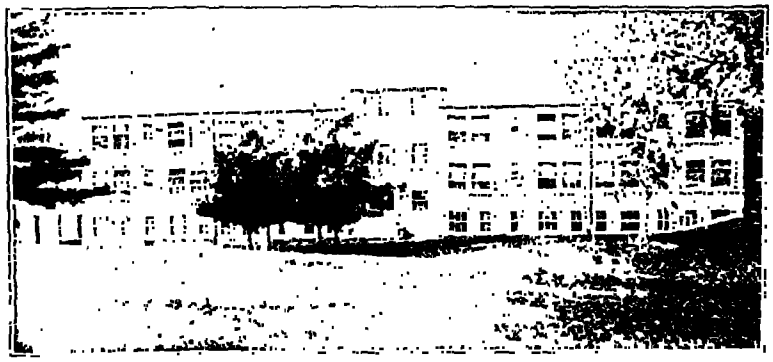
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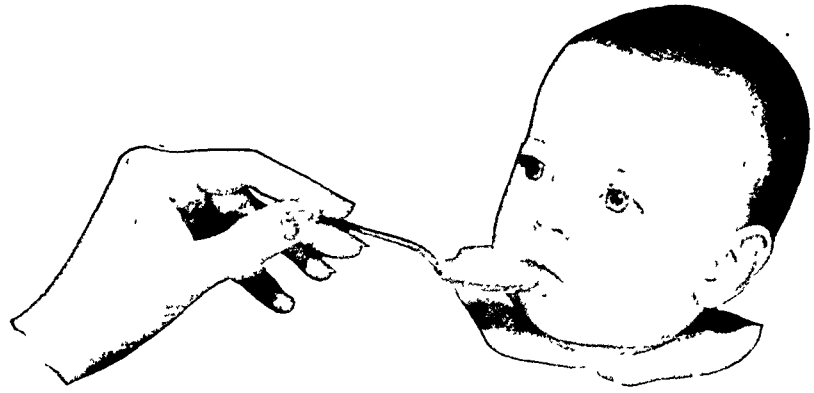
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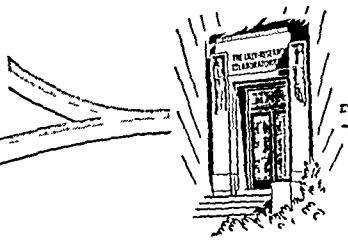
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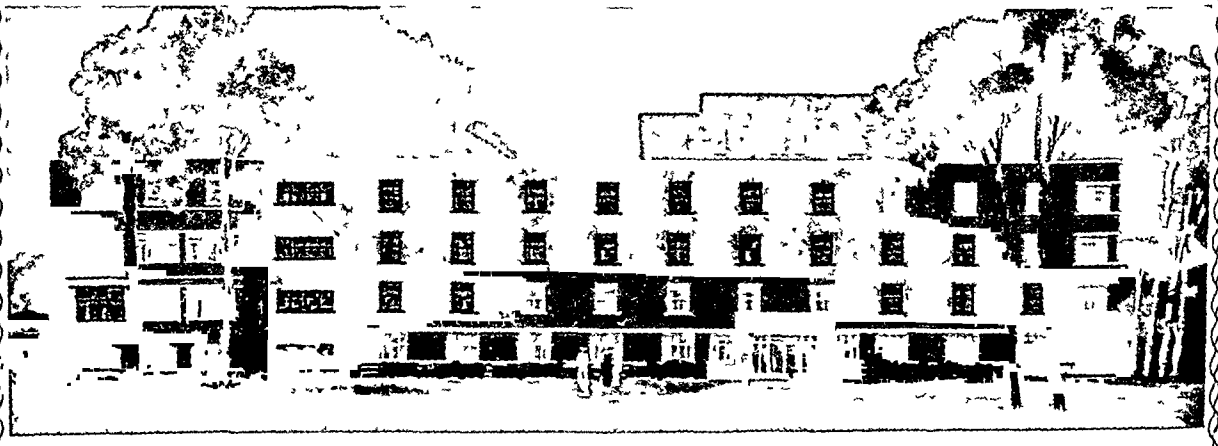
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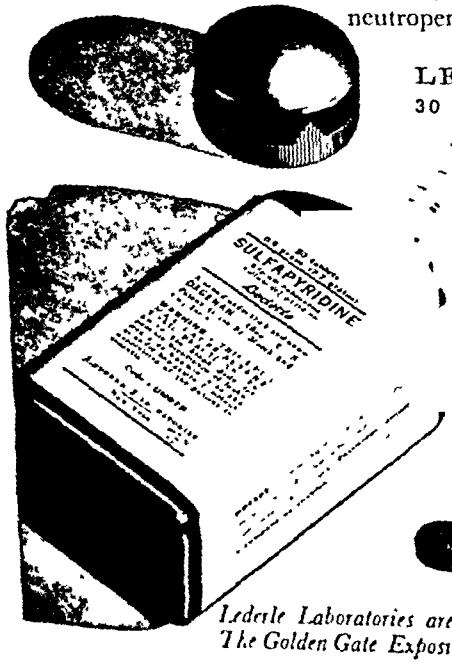
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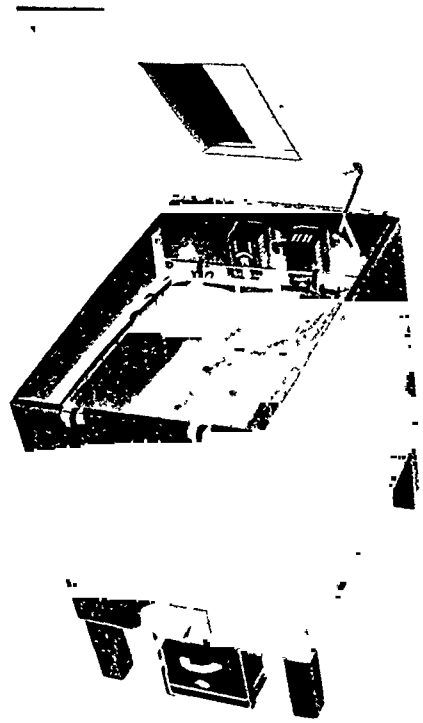
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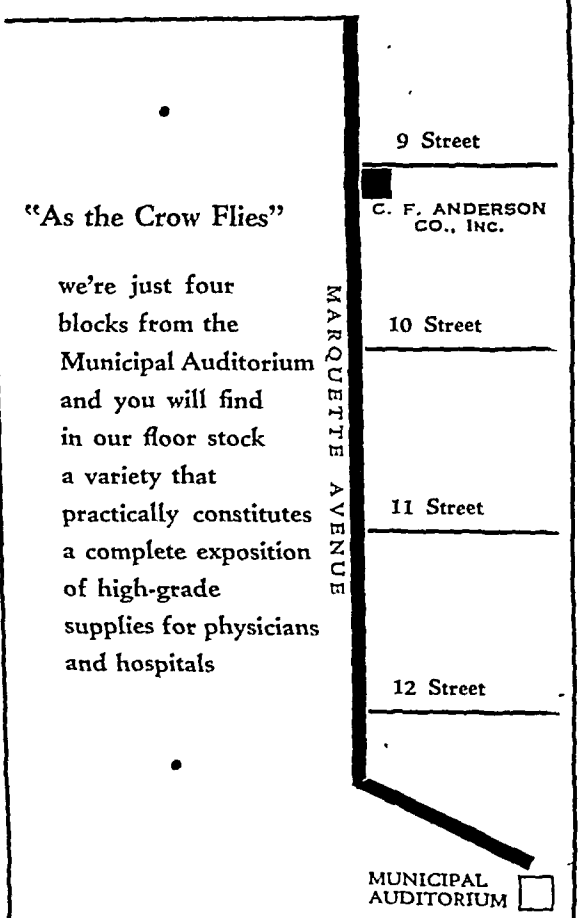
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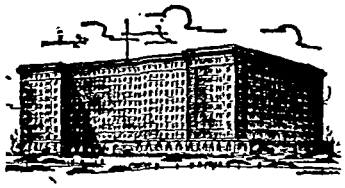
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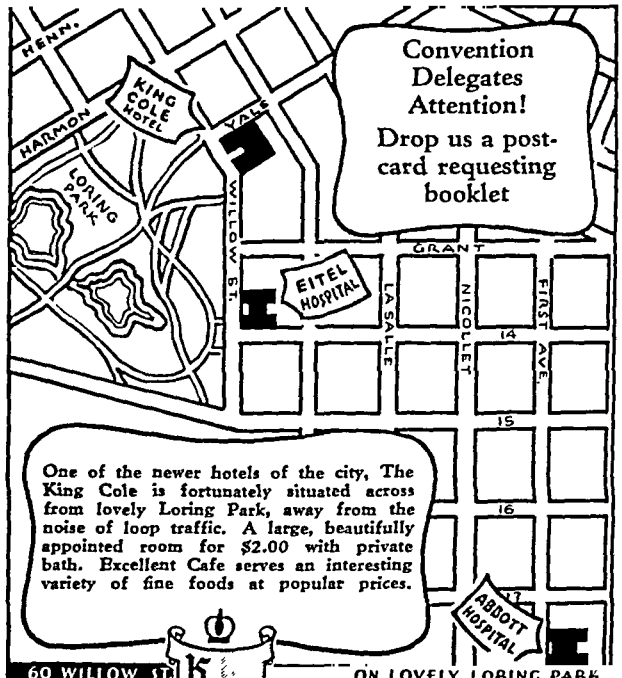
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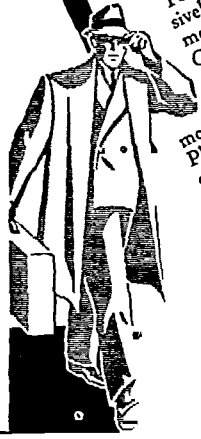
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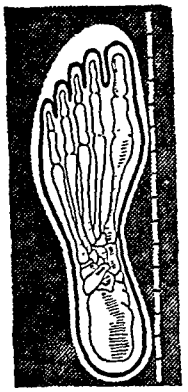
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The JOURNAL LANCET

Minneapolis Minnesota
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Vol LIX, No 5
New Series

Chemical Blood Analyses of Clinical Significance*

Mildred R. Ziegler, Ph.D.
Minneapolis, Minnesota

CHEMICAL analysis of the blood furnishes information of value in the diagnosis, prognosis and treatment of clinical conditions in all branches of medicine. Blood may be regarded as a physiochemical system in which the chemical constituents reflect the metabolic processes going on in the body. Since one of its most important functions is to act as a transportation system to carry oxygen and nutritive materials to the tissues and to convey waste products to the excretory organs, it is evident that faulty metabolism or improper elimination may frequently be demonstrated by a chemical analysis of blood. The significance of results so obtained can readily be ascertained by comparison with established normals.

In Table I are listed the normal values and those clinical conditions in which deviations from the normal are characteristic. It must be remembered that these values are not absolute and that changes do not necessarily always occur.

Some general considerations of practical importance which arise in connection with a chemical blood analysis should be considered It is essential that blood specimens be secured under as nearly uniform conditions as possible. In infants blood should be drawn just before a feeding or preferably after omission of one regular feeding; in children and adults after a 12 to 14 hour fast. All values for blood constituents referred to as "normal" are those obtained from fasting specimens. When pH, CO_2 content and chlorides are to be determined, the blood should be collected over mercury or under pure mineral oil to prevent loss of CO_2 and hence to prevent important shifts in the electrolytes between cells and serum.

Since most analyses are made on plasma or serum, the latter should be removed from the cells immediately after the blood is centrifuged. Analyses should be made promptly after the blood is drawn or at least carried to a point in the particular method where it can safely be left without the danger of further change. Such changes as glycolysis, decomposition of nitrogenous substances and hydrolysis of the organic phosphorus compounds of the cells take place very rapidly in vitro. Hemolysis interferes with certain determinations and so should be avoided so far as possible. For example, since nearly all of the potassium of blood is in the cells, it may be greatly increased in hemolyzed specimens. The anticoagulants most frequently used are the oxalates or citrates of potassium, sodium, or ammonia in a concentration of 0.1 to 0.2 per cent. The amount should be kept to a minimum as an excess interferes with precipitation of proteins and also with uric acid determinations. Even in comparatively low concentrations such anticoagulants may cause slight shifts of water and electrolytes between cells and serum and alterations in the carbon dioxide combining power.

Results are generally expressed in milligrams per 100 cc. of serum, plasma or whole blood. The concentrations of the various inorganic constituents are also frequently represented by milliequivalents per liter. A milliequiva-

*From the department of pediatrics University of Minnesota

TABLE I.

Chemical Constituents of Human Blood

Blood Constituent	Normal Range	Pathologic Conditions in Which Abnormal Values Occur	
		Increased in	Decreased in
Total solids	(per 100 cc.)[1] 19—23	Anhydremia	Hydremic plethora; anemias
Hemoglobin (Haden)	15.6 gm.	Polycythemia; dehydration	Anemias, primary and secondary
Total non-protein nitrogen	25—35	Nephritis; eclampsia; metallic poisoning; intestinal obstruction; prostatic obstruction; Addison's disease; dehydration; hemorrhage	
Urea nitrogen	10—15	(See non-protein nitrogen)	
Uric acid	2—3.5	Gout, idiopathic and lead; toxemias of pregnancy, eclamptic and nephritic; cardiac decompensation; nephritis; leucemia; polycythemia; chronic eczema and allied dermatoses; fatal chloroform poisoning; prolonged fasting.	Icterus
Creatinine	1—2	Nephritis	
Creatine	3—7	Nephritis; severe traumatic injury of muscle; catatonic states	Deteriorating dementia praecox
Amino acid nitrogen	5—8	Liver disease with extensive destruction; severe nephritis; leucemia	
Total proteins (plasma)	6.5—8.2 gm.	Anhydremia; multiple myeloma	Nephrosis; nutritional edema; essential hypoproteinemia due to atrophy and cirrhosis of the liver
Albumin (plasma)	4.6—6.7 gm.	Anhydremia	(See total proteins)
Globulin (plasma)	1.2—2.3 gm.	Nephrosis; uremia; multiple myeloma; syphilis; pneumonia; anaphylaxis; kala-azar	Essential hypoproteinemia due to atrophy and cirrhosis of the liver
Fibrinogen (plasma)	0.3—0.6	Acute infectious diseases	Cirrhosis of the liver; chloroform or phosphorus poisoning; acute yellow atrophy of the liver; severe anemias; typhoid fever
Total fatty acids (plasma)	190—450	Lipemias; ether narcosis; diabetes, uncontrolled; pneumonia; nephritis; anemias.	
Total cholesterol (whole blood) (plasma)	150—230 100—230	Nephrosis; hypothyroidism; severe diabetes, uncontrolled; biliary obstruction; xanthomatoses; ketogenic diet; pregnancy	Hyperthyroidism; uremia; acute infections; syphilis; leprosy; tuberculosis
Cholesterol, free (plasma)	30—138	Pregnancy	
Cholesterol, esters (plasma)	40—160	Pregnancy	Acute infections
Lecithin (plasma)	175—330	Diabetes, uncontrolled; anemias (R.B.C.); pregnancy; hypothyroidism; syphilis	Anemias (plasma)
Iodine number[2] (plasma)	100—120		Infantile eczema; acute infections; lipemias
Icteric index	3.5—5.5	Hemolytic anemias; liver disease; obstructive jaundice	
Van den Bergh bilirubin	0.1—0.25	Biliary obstruction; hemolytic anemias	
Glucose	70—120	Diabetes, uncontrolled; cerebral lesions; asphyxia; hypercorticoadrenalism; dehydration; hyperpituitary stages of acromegaly; hyperthyroidism	Hyperinsulinism 1. Insulin overdosage 2. Idiopathic 3. Adenoma of the pancreas Liver diseases; Addison's disease; chloroform poisoning; recurrent vomiting in children; progressive muscular dystrophy; hypopituitary stages of acromegaly; hypothyroidism; glycogenosis
Total acetone bodies[3] Acetone + aceto-acetic[3] B Hydroxybutyric acid[3]	0.8—2.6 0.3—2.0 0.5—3.0	Diabetic acidosis; starvation	
O_2 capacity O_2 content (arterial blood) O_2 content (venous blood)	16—24 vol. 15—23 vol. 10—18 vol.	Polycythemia; anhydremia	Anemias; cardiac and respiratory diseases
Lactic acid	5—20	Exercise; asphyxia; eclampsia; hyperinsulinism	
pH	7.33—7.43	Alkalosis, uncompensated (see CO_2 combining power)	Acidosis, uncompensated (see CO_2 combining power)

TABLE I. *(Continued)*
Chemical Constituents of Human Blood

Blood Constituent	Normal Range	Pathologic Conditions in Which Abnormal Values Occur	
		Increased in	Decreased in
CO combining power (plasma)	45—60 vol	Alkalosis 1 Hyperpnea 2 Vomiting 3 Excess intake of alkali	Acidosis 1 Diabetes, uncontrolled 2 Nephritis 3 Diarrhea 4 Asphyxia
CO_2 content (plasma of arterial blood) CO_2 content (plasma of venous blood)	45—55 vol 50—60 vol		
Total phosphorus (plasma)	8—18		
Lipoid phosphorus (plasma)	5—13	(See lecithin)	(See lecithin)
Acid soluble phosphorus (plasma)	2 5—5 5		
Inorganic phosphorus (plasma) adults children	 3—4 4—6	Renal rickets, nephritis, hypoparathyroidism, uremia	Infantile rickets, coeliac disease, hyperparathyroidism
Phosphatase (plasma) adults[4] children[5]	0 1— 0 21K U 1 5— 4 00B U 5 0—12 00B U	Osteitis deformans, generalized osteitis fibrosa, osteomalacia, infantile rickets, renal rickets	
Sulfates, inorganic (plasma)	0 5—1 0	Nephritis	
Chlorides calculated as NaCl (whole blood) (plasma) Chlorides, calculated as Cl (whole blood) (plasma)	 450—500 550—620 275—325 350—380	Nephritis, cardiac conditions, prostatic obstruction, eclampsia, anemias, diarrhea	Fever, burns, pneumonia, Addison's disease, diabetes, vomiting, anaphylactic shock
Iodine, total[6] inorganic hormonal	8γ[7] 4γ 4γ	Varies with iodine content of diet Hyperthyroidism	Varies with iodine content of diet Hypothyroidism
Calcium (serum)	9—12	Hyperparathyroidism, gastric tetany, Paget's disease, polycythemia vera, multiple myeloma	Hypoparathyroidism, idiopathic and post operative, infantile tetany, low calcium rickets, renal rickets, coeliac disease, non tropical sprue, steatorrhea, nephrosis, hypoproteinemia, osteomalacia
Magnesium (serum)	1—3	Hyperparathyroidism	Hypoparathyroidism, infantile tetany
Sodium (plasma)	330	Hypercorticoadrenalism (in exceptional cases)	Addison's disease
Potassium (plasma)	16—22	Addison's disease, diabetes uncontrolled, uremia, intestinal obstruction, acute infections	Hyperinsulinism, hypercorticoadrenalism (in exceptional cases), familial periodic paralysis

1 Values are expressed as mg in 100 cc of whole blood unless otherwise indicated
2 Iodine number is the grams of iodine absorbed by 100 Gm of fat
3 Expressed as acetone
4 One Kay unit of phosphatase per cc is one of which 1 cc will liberate 1 mg of inorganic phosphate (expressed as P) from sodiumβ glycerophosphate solution in 48 hr at 38° and at a pH of 7 6
5 One Bodansky unit of phosphatase is equivalent to 1 mg of P liberated from a sodiumβ glycerophosphate substrate as the P ion in 1 hr at 37° and a pH of 8 6
6 All iodine values determined by Dr J F McClendon
7 A microgram (γ) is a 0 001 mg

lent is one thousandth of the equivalent weight in grams and is contained in 1 cc of a normal solution. For example, the bivalent element, calcium, with a molecular weight of 40 has an equivalent weight of 20 Therefore, 1 milliequivalent (m eq) of calcium is equal to 20 milligrams (mgm.). One should always consider whether the value is for whole blood or plasma. Confusion is thus avoided for some constituents like chlorides and cholesterol which are unfortunately given sometimes for whole blood, otherwise for plasma. Plasma and serum contain practically the same amounts of the various constituents with the exception of fibrinogen which is present in plasma but not in serum.

TOTAL NONPROTEIN NITROGEN

The total nonprotein nitrogen of the blood consists of the nitrogen of urea, uric acid, creatinine, creatine, ammonia, amino acids and undetermined nitrogen which are partly exogenous and partly endogenous in origin. Nonprotein nitrogen increases above normal whenever the rate of production of its factors exceeds their rate of utilization and elimination. Its variation in the blood, therefore, normally parallels the nitrogen metabolism. Children normally have slightly lower values than adults In renal insufficiency and in conditions associated with excessive tissue destruction the nonprotein nitrogen is

elevated. To be of pathological importance the total nonprotein nitrogen should be above 40 mgm.

UREA NITROGEN

Urea is the chief end product of endogenous and exogenous protein metabolism in the body. Urea nitrogen normally forms about half of the nonprotein nitrogen of the blood. With nitrogen retention the proportion increases, sometimes to as much as 80 per cent. Elevation of the urea fraction ordinarily has the same diagnostic significance as increase in the total nonprotein nitrogen. Therefore, it is rarely necessary to order both determinations in the same specimen, except for the purpose of checking one against the other. Many clinicians prefer a urea nitrogen determination. Folin, however, considered a nonprotein nitrogen finding to be of more value. This is likewise the opinion of our own laboratory.

CREATININE

A knowledge of blood creatinine is important in studying renal diseases. Its concentration in the blood in health and in diseases other than those involving impairment of renal function is very constant. Nearly all other pathological conditions which affect the rest of the nitrogenous compounds of the blood have little influence upon it. Myers[1] has shown that in progressive loss of renal function the blood concentrations of uric acid, urea and creatinine increase in the order named. He believes that any considerable rise of the blood creatinine occurs only as the disease approaches a fatal termination. It is evident from this that determination of blood creatinine is not required, unless there is nitrogen retention, as indicated by an increase in the nonprotein nitrogen or the urea nitrogen. In chronic nephritis a creatinine value above 5 mg. per 100 cc. indicates an unfavorable prognosis. In milder cases of nephritis the urea concentration index is more useful than blood creatinine determinations. In acute nephritis and in acute mercuric chloride poisoning blood creatinine is of little prognostic value.

URIC ACID

Uric acid has been diagnostic of gout ever since Garrod's classical research. High values are also found in starvation, in conditions involving nitrogen retention and in diseases characterized by increased destruction of body protein. In the latter group the uric acid is derived from the nucleoprotein of the tissues as well as the purines in the diet.

TOTAL PLASMA PROTEINS

The total plasma proteins which are made up of albumin, globulin and fibrinogen, are decreased by a loss through the kidney, by prolonged use of a diet deficient in protein or by an inability on the part of the body to fabricate new protein. The deficit which results is usually in the albumin fraction and is accompanied by a tendency to edema. It is generally agreed that a reduction of albumin below 2.5 Gm. or a total protein below 5.5 Gm. per 100 cc. of plasma is likely to be followed by edema. There may be a reversal of the albumin globulin ratio due largely to an increase of the globulin fraction. Newly born infants not unfrequently show hypoproteinemia.

LIPIDS OR FATS

Blood lipids are divided into three main groups: (a) true fats or triglycerides of the fatty acids; (b) phospholipids of which lecithin is an example and (c) sterols of which cholesterol is the most common representative found in blood. Hyperlipemia is encountered clinically when an excessive amount of fat is ingested or when the body is unable to utilize the fat absorbed, as in diabetes mellitus. The occurrence of lipemia in disease is caused by some functional disorder. Extensive liver disease is frequently accompanied by lipemia. Less is known about hyperlecethinemia and hypercholesterolemia but these changes tend to follow a rise in the neutral fat of the blood. Bloor has suggested that cholesterol aids in the transport of fatty acids. Although the various fractions of the lipids have been studied extensively in various clinical conditions, the results have yielded little of specific diagnostic value, except in thyroid disorders and lipoid nephrosis. In hypothyroidism hypercholesterolemia is practically the rule. In nephrosis all fractions of the blood lipids tend to be elevated in direct proportion to the severity of the symptoms.

GLUCOSE

The normal range for blood sugar varies with the method employed. The latest methods of Folin and Benedict give lower sugar values and are nearer the true glucose content of the blood. The non-fermentable or non-glucose reducing substances amount to about 8 mg. of glucose per 100 cc. of blood when one of these methods is used. Glucose determinations in blood are probably employed more than any other single blood analysis. It is of inestimable value as an aid in the diagnosis and treatment of diabetes mellitus. It is of paramount importance in the differentiation of true diabetes from simple glycosurias. It is likewise indispensable in the diagnosis of obscure cases of hypoglycemia.

For determining the true status of the carbohydrate metabolism there is no better clinical method than an alimentary glucose tolerance test. Recently Exton[2] has recommended a modified glucose tolerance test, which may replace the standard procedure now in use, because of its superior features. This "one-hour-two-dose" glucose tolerance test is based on the paradoxical law of Allen which is stated in the latter's words as follows: "Whereas in normal individuals the more sugar given the more is utilized, the reverse is true in diabetes." The test is simple and is economical of time both from the standpoint of the patient and that of the laboratory. It is more specific in character and, according to Exton, tends to diminish the number of equivocal results. In interpreting fasting blood sugar values it is well to recall that morphine, general anesthetics, amytal, drugs of the caffeine group and quinine raise the blood sugar. It is sometimes desirable to determine glucose in the cerebrospinal fluid. Since spinal fluid is a dialysate of blood serum, sugar changes in blood will be reflected in it. The determination of the cerebrospinal fluid glucose without

knowledge of the blood sugar level at the time is not of great value. Ordinarily the sugar of the spinal fluid is slightly lower than that of the blood.

Icteric Index

The icteric index is a procedure of distinct value in estimating the bilirubin in the blood serum. As a measure of the functional activity of the liver it is useful as an aid in the diagnosis of cirrhosis and malignancy of the liver; in the detection of cholelithiasis and cholecystitis without clinical jaundice; and in obstructive jaundice differentiating between malignancy and acute catarrhal jaundice, by indicating whether the jaundice is increasing. As low or normal values are found in non-hemolytic anemia, it is of importance in the differential diagnosis of the anemias. During the administration of arsenicals an increased icteric index may be the earliest indication of hepatic damage. The Van den Bergh reaction gives added information regarding bilirubin in the blood in some cases. It helps to differentiate between obstructive and non-obstructive forms of jaundice.

Phosphatase

Phosphatase is an enzyme found in blood, muscle, actively growing bone and cartilage, renal and intestinal tissue and in small amounts in other organs. It liberates inorganic phosphorus from organic phosphorus compounds. The enzyme occurs in increased amounts in the plasma of patients with certain disturbances of calcification. Although up to the present time determination of phosphatase has not been extensively used as a clinical aid, it promises to be employed for this purpose more frequently in the future.

Acid-Base Balance

Under physiological conditions the acid-base balance of the blood is maintained by a combination of the processes of neutralization and excretion. Deviations of the pH from the normal occur only as a result of extremely severe disturbances of the body's mechanisms for preserving physiological constancy of the acid-base balance. It is usually not necessary to determine the pH of the blood for diagnostic purposes but it is essential to understand the mechanism by which acid-base balance is maintained, if one wishes to understand and treat conditions of acidosis and alkalosis. The maintenance of a normal pH depends on the maintenance of a balance between alkaline bicarbonate $BHCO_3$ and the acid H_2CO_3. If both increase in the same ratio no change in the pH occurs. A rise in H_2CO_3, the $BHCO_3$ remaining the same, causes a fall in pH and an uncompensated acidosis occurs. If the H_2CO_3 drops in proportion to the base bicarbonate we have a compensated acidosis with no change in pH. A rise in $BHCO_3$, while H_2CO_3 remains the same, produces an uncompensated alkalosis. In cases of uncompensated acidosis and alkalosis, a pH determination is essential to correctly evaluate the acid-base balance. The simplest and best method of obtaining information concerning the acid-base balance is a determination of the carbon dioxide combining power which is a measure of the alkaline reserve and an index of acidosis or alkalosis. Low values are present in all diseases associated with acidosis, high ones in alkalosis. Figures for the infant tend to be somewhat lower than those for the adult. Normally the acids of the blood balance the bases as expressed by the following equation: Total bases ($Na+K+Ca+Mg$) $=$ total acids ($Cl+HCO_3+PO_4+$protein$+SO_4$ and organic anions). The average normal values for these are as follows: Na, 142; K, 5; Ca, 5; Mg, 3; Cl, 103; HCO_3, 28; PO_4, 2; protein, 16; SO_4 and organic acid, 6 milliequivalents per liter.

Sodium and Potassium

Sodium of the blood is practically all in the plasma, while nearly all of the potassium is in the cells. Variations in sodium values alone are not especially diagnostic of any clinical condition. However, in Addison's disease, plasma sodium tends to be decreased and in exceptional cases of hypercorticoadrenalism, it is increased. With the decrease in sodium in adrenal insufficiency there is a corresponding increase in plasma potassium. This disturbance in the electrolyte pattern is usually corrected by the administration of adrenal cortical extracts or by a low potassium, high sodium intake. In cases of familial periodic paralysis the serum potassium is characteristically lowered. It can be increased, however, by the administration of potassium salts with complete alleviation of all symptoms.

Calcium and Phosphorus

Nearly all of the calcium of the blood is present in the serum. Between 40 and 60 per cent is in the freely diffusible state, while the remainder is combined, chiefly with proteins. In conditions in which the serum proteins are lowered, the non-diffusible fraction is correspondingly decreased, giving a low total calcium, as in some cases of nephrosis. In multiple myelosis, on the other hand, both the protein and the calcium are increased. A portion of the diffusible calcium exists in the ionized form. McLean[3] has devised a chart from which the calcium ions can be estimated if the total calcium and total serum proteins are known. Peters and Van Slyke[4] believe that our knowledge of the significance of serum calcium in clinical disease might be measurably advanced, if it became more common practice to determine inorganic phosphorus and protein together with calcium. It is important to follow the blood calcium of patients who are receiving parathyroid extract in order to prevent overdosage.

The determination of serum calcium without inorganic phosphorus is of little value. In rickets the two values assist in diagnosing the condition as indicated in the table. Repeated determinations indicate the value of the therapy employed. The diagnosis of parathyroid disorders is aided by a consideration of calcium and phosphorus findings. Hypoparathyroidism results in hypocalcemia and hyperphosphatemia, whereas hyperparathyroidism (osteitis fibrosa cystica) produces changes in the opposite direction. In renal disorders increased serum phosphorus is an unfavorable prognostic sign.

VITAMIN C

In certain clinical conditions the estimation of reduced vitamin C in the blood by chemical analysis is desirable. The average normal value for vitamin C in the blood plasma is 0.8 mg. or above in 100 cc. In the prescorbutic state the range is said to be between 0.8 and 0.6 mg. in 100 cc., while in active scurvy it falls below 0.5 mg. in 100 cc.

The results of chemical blood analyses are of significance only when properly interpreted in conjunction with the results of clinical examinations. The result of a single determination should be confirmed by additional tests whenever a discrepancy between this and the clinical findings is encountered.

Certain miscellaneous blood analyses, such as the determination of lead for confirmation of a diagnosis of lead poisoning, are at times of very great value in obscure cases. Likewise the determination of the level of sulfanilamide in the blood from time to time during the course of active sulfanilamide therapy serves as a reliable guide to dosage.

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Foreign Body (Bobbie Pin) in Duodenum

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IT has been said that in children, almost any foreign body which passes the narrow part of the esophagus, opposite the cricoid cartilage, will sooner or later pass by rectum.[1] As an every day working principle, this holds true. There are occasional exceptions, however, such as the sharp pointed pin, open safety pin or long narrow objects which have difficulty, especially in traversing the duodenum.

Time does not change the habits of small children of putting almost any object in their mouths. Time does change the variety of small objects about the home. The dime store and the dictates of fashion continuously supply new objects to be swallowed and create new problems for the physician and surgeon. The bobbie pin, a sort of modified hair pin, can be found in almost any home at the present time, and it is but natural that a few of them are going to be swallowed by small tots. One would suppose that so small and slender an object would easily pass the alimentary tract. That such is not the case is illustrated by the following case history.

CASE REPORT

C. R. O., girl age 2½ years, and rather small for her age, was brought into the office by her mother June 13, 1938. The mother stated that the child insisted she swallowed a bobbie pin and that it stuck in her throat. With this history, the entire alimentary tract was X-rayed and the pin located in the stomach. The child was apparently in no discomfort and so rather free assurance was given the parents that the pin would probably pass the natural way. Directions were given to give the child bulky foods in order to facilitate its passage.

On June 17, 1938, X-rays showed the pin in a horizontal position apparently in the duodenum. The child now had become rather cross and irritable and would not eat well. On June 20 the position had shifted to an oblique angle in a position corresponding to the fourth part of the duodenum. On June 23, another X-ray was taken immediately following the giving of a tablespoonful of barium mixture. This clearly showed that the pin had slid back into the retroperitoneal portion of the duodenum and that the distal portion of the pin was the round folded end. Further X-rays daily showed the pin in the fourth part of the duodenum where it remained in position, as shown in figure 1. By this time the child was very cross and irritable, complained of pain in the upper abdomen and would not eat.

On June 25, operation was advised and done under gas ether anesthesia. An upper right rectus incision was made and the abdomen opened. The transverse colon and omentum was lifted up and the bobbie pin was palpated pointing through the duodenal jejunal angle. An attempt was made to manipulate the pin into the jejunum in a position more favorable for removal. This could not be done. It was noted that there was considerable redness of the peritoneal covering of the duodenum and first part of the jejunum and we were afraid to use any but the most gentle manipulations. We then succeeded in fixing the pin by applying lightly a rubber clamp and massaging the jejunum back over the distal portion of the pin. After packing off the field carefully, we made a small incision in the jejunum, about one inch from the duodenal jejunal angle, and removed the pin.

The opening in the bowel was closed by two rows of Lambert sutures, using a small intestinal needle. There was no soiling of the peritoneum. The abdominal wall was closed, without drainage, using No. 0 plain for peritoneum, No. 1 chromic for fascia and two retention sutures and dermol for the skin. The pin measured 5 cm. (2 inches) in length and .5 cm. (3/16 inch) in width at the widest or folded end.

Convalescence was relatively uneventful except that on the fourth day the child got out of bed while unattended and broke open the wound. It was necessary to resuture the entire abdominal wall. Recovery took place without herniation.

There are anatomical reasons why long slender objects are apt to be held up in the duodenum. The major portion of the duodenum is retroperitoneal and relatively immobile. This retroperitoneal portion can be likened to a rigid tunnel with a flexible tube, the stomach and first part of the duodenum as the entrance, and another flexible tube, jejunum, as the exit. It is obvious that long objects can be so manipulated by peristaltic action

as to be pushed into the duodenum. The exit from the duodenum, however, may be impeded by the rather acute bend formed by the duodenal jejunal angle. This angle is further accentuated by the suspensory muscle of the duodenum (Treitz), which is described as a band of involuntary muscle fibres running from the left pillar of the diaphragm to the angle. It is obvious that a long object would have difficulty in negotiating this curve because of the immobility of the retroperitoneal portion of the duodenum. Another anatomical factor which plays a part is the nature of the rugae in the duodenum and first part of the jejunum. Here the rugae are deep and run transversely across the bowel and allow the distal point of the object to be caught in these deep folds, further impeding its progress.

That long slender objects are often held up in the duodenum, especially in children, is further proven by studying the literature on foreign bodies in the duodenum. The following references are cited:

An infant, age 4 months, swallowed a bar pin which was removed from the duodenum.[2] Arrigoni reports a nail removed from the duodenum in a child, age 15 months.[3] Feriz reports a glass eye from a teddy bear with a long pin attached, incarcerated in the duodenum.[4] Simon tells of removing a coffee spoon from the duodenum.[5] There is a report by Fieschi of removing a needle from the duodenum of a child, age 3 months.[6] Also, there is a report by Chaton of a metal hair barrette removed from the fourth part of the duodenum.[7] Rivarola reports two cases of removal of nails from the duodenum in children.[8] Raymond reports the removal of a bobbie pin from the duodenum in a girl, age 14 months.[9] In this case, the pin became caught in the first part of the duodenum and was removed by an abdominal incision, pushing the pin back into the stomach and without opening the stomach, threading the pin into a catheter and withdrawing it through the mouth. Greeley reports two cases of slender objects removed from the stomach and duodenum by a similar procedure.[10] Henrard reports the surgical removal of a pin in the duodenum in an infant, age 5 months.[11]

In all these references it will be noted the object removed was long and slender.

CONCLUSIONS

In children, when the objects swallowed are long and slender, such as nails, bobbie pins, hair pins, bar pins, etc., we cannot be too free with our assurances that the object will be passed the natural way. It has been shown

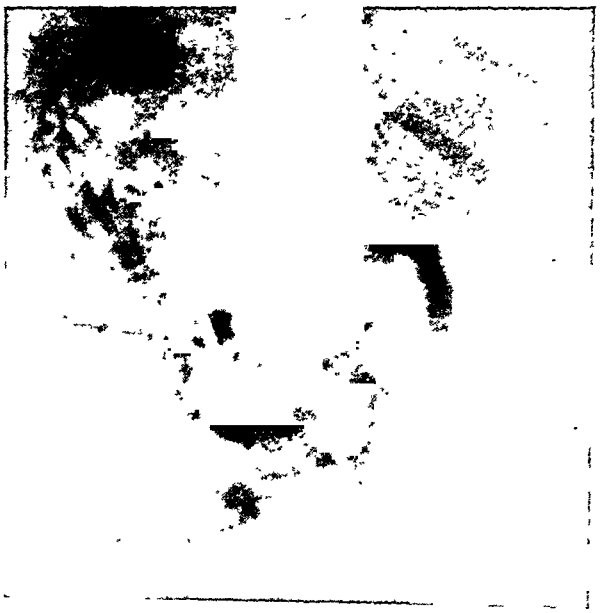


FIG. 1. Roentgenogram showing bobbie pin in fourth part of duodenum in a child 2½ years old.

that anatomical reasons favor the incarceration of such objects in the first or fourth part of the duodenum where removal is difficult. It follows then that it might be wise to remove such objects while they are in the stomach either by gastrotomy, by the esophagoscope, or by the catheter method—procedures that are safer and more simple than duodenostomy.

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Chronic Idiopathic Xanthomatosis of the Hand-Schuller-Christian Type*

With Special Reference to the Oral Manifestations
Report of Three Cases

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HAND-SCHÜLLER-CHRISTIAN'S syndrome belongs to the group of idiopathic xanthomatosis characterized by the local deposition of lipids in the various tissues of the body. The lipids so deposited are essentially the same type as found normally in the body. The etiology of the disease is not known. It has been considered as a metabolic disturbance in which cholesterol and its esters are abnormally produced and deposited, by some physical colloid mechanism, into the reticulo-endothelial cells and other tissues. Lichty[1] and Cowie and Magee[2] found cholesterol to be the predominating lipid in the xanthomatous deposits, comprising 50 per cent of the total lipid content. Histologically, the yellowish masses are composed of lipid-laden histiocytes or "foam" cells. These "foam" cell masses then undergo fibrosis and granulomatous tumor formations occur. In the fully developed form of the disease, these tumor formations produce striking bony defects, which may appear in any part of the skeleton, but are particularly prone to localize in the membranous bones of the skull. These lesions are destructive and as they expand, give rise to pressure symptoms. The syndrome is most commonly characterized by exophthalmos, diabetes insipidus, and occasionally by dwarfism or acromegaly, hypogonadism or dystrophia adiposo-genitalis, and a cachexia of pituitary origin.

Although the Hand-Schüller-Christian syndrome has been reported in adults, it is characteristically a disease of childhood. It occurs in a sex distribution ratio of 3:2 in favor of males.

While it is well known that a marked gingivitis is a common symptom of the disease, comparatively few reports have discussed the various other oral manifestations of the syndrome. In 1905, Kay[3] reported separation of the gums from the teeth followed by a gradual loss of the latter, starting with the molars. Griffith[4] commented on the marked irregularity of the teeth. The patient described by Thompson, Keegan, and Dunn[5] developed a severe gingivitis followed by resorption of the alveolar process which caused many teeth to become loose. Chester and Kugel[6] reported a 28-year-old male who lost all of the teeth on one side of the maxilla and several from the mandible. Another adult, a 23-year-old female, developed pain in a tooth, stomatitis, and looseness of teeth, following which multiple areas of decalcification were found in the mandible.[7] Hankey[8] reported a male who at the age of 33 years first developed looseness of his teeth. The condition was diagnosed as periodontoclasia and the teeth were extracted. Three years later, the patient's denture would not fit because of an enlargement of the mandible. There were no other systemic disturbances. Roentgenograms showed a diffuse rarefaction throughout the body of the mandible. The tissue removed by biopsy revealed a granulomatous growth resembling that of xanthomatosis. It was then learned that the patient had had polydipsia and polyuria of five years duration. There was clinical improvement following the use of radium and pitressin. In a series of 124 patients, Dauksys[9] noted gingivitis with loosening of teeth and exfoliation in 23, or 18 per cent. A number of other observers have made reference to the occurrence of intractable gingivitis, looseness, and exfoliation of the teeth as a result of xanthomatous destruction of the alveolar processes.[10,11,12,13,14,15,16,17]

The oral manifestations in the Hand-Schüller-Christian syndrome seem of sufficient interest, therefore, to warrant the reporting of three patients studied at the University of Minnesota Hospital.

CASE REPORTS

Case 1. D. L., a female aged 7, was first admitted to the University of Minnesota Hospital in 1930 because of exophthalmos, loss of vision, and malnutrition. The exophthalmos, together with a moderate enlargement of the head, were noticed during the first few months of life. On admission, physical examination revealed a hydrocephalic head with a tendency towards scaphocephaly. There was a palpable defect in the occipital area of the skull. A bilateral buphthalmos existed together with an opaque cornea, injected sclera, and photophobia. The teeth were poorly formed and malocculded with an anterior open bite. Several large, brown nodules were present in the skin over the lower back, abdomen, and buttocks. Laboratory examinations of urine and blood were negative. The blood, Wassermann and Mantoux tests were negative. The serum cholesterol of 197 mg. per cent was within normal range. Roentgenographic examination showed multiple defects in the skull suggestive of xanthomatosis.

In 1933, the patient was readmitted because of pain in the right eye. Examination at this time revealed the bony defects described above and an increased number of nodular pigmented areas of the skin over the trunk and extremities. The oral examination disclosed a moderate gingivitis. The serum cholesterol (166 mg. per cent) and the total fatty acids (337 mg. per cent) were within the normal range; while the value for lecithin (102 mg. per cent) was slightly below normal. A glaucoma had developed in the right eye and the intra-ocular tension was reduced by operation. Further roentgenographic examination did not show any extension of the defects in the skull and no similar defects in the long bones. Because of the marked loss of vision, the patient was discharged to a state institution for the blind.

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Fig 1. D L, aged 7 years. Photograph demonstrating buphthalmos

Case 2. G. S, a male aged 4 years 10 months, was first admitted to the University of Minnesota Hospital in October, 1932. His parents first noted exophthalmos of the right eye when the boy was 2 years 9 months of age. Two months later a physician was consulted because the exophthalmos had become bilateral and numerous soft tumors were palpable over the scalp. Roentgenographic examination showed multiple irregular areas of rarefaction throughout the entire skull. There was no involvement of any other bones. Biopsy of one of the scalp nodules was diagnosed as multiple myeloma by one pathologist. Laboratory examinations revealed no abnormalities of the blood or urine The Bence-Jones protein was never demonstrated. Blood cholesterol values were within normal range. The physician, however, felt that this patient belonged to the Schüller-



Fig. 2. D. L. Lateral skull roentgenogram taken November 21, 1930. Arrow points to defect in the occiput.

Christian syndrome and instituted a series of roentgen ray therapy. This treatment apparently caused the soft masses in the scalp to disappear and stimulated repair of the bony defects.

One year later, the patient was again examined by his physician at which time the bilateral exophthalmos had become marked and areas of rarefaction were present in the ribs, pelvis, and femora, as well as in the skull. Another series of roentgen ray therapy was given. This was again followed by bone regeneration. In June, 1932, gingivitis and loosening of the teeth were first noted. There was no history of polydipsia and polyuria at any time.

At the time of the patient's admission to the University Hospital, there was a marked bilateral exophthalmos. Roentgenograms of the mouth showed normal development of the permanent teeth but there was a considerable amount of destruction



Fig 3 G. S Photograph taken October 7, 1932, when the patient was 4 years 10 months Note the marked exophthalmos This condition was bilateral



Fig 4. G. S Dental cast, Oct. 17, 1932. Arrows point to erupted upper right, upper left and lower left first permanent molars and right permanent bicuspid Note shrinkage in molar area



Fig. 5. G. S. Lateral skull roentgenogram taken October 8, 1932. Arrows point to defects in the skull. The lateral margins of the orbit, the sphenoid bone and the vault are all involved.

of the bony tissue in the molar region. Three of the first permanent molar teeth and the lower right first bicuspid tooth had erupted. The molars were loosened and the surrounding gum tissue was eroded. Superimposed upon this oral condition was a Vincent's infection which was intractable to extensive local treatment with chromic acid and hydrogen peroxide solutions. Neo-salvarsan was also given intravenously. However, no definite improvement was observed until the molar teeth were extracted. After the latter procedure, there was a marked change for the better.

Laboratory examinations, including blood, Wassermann and Mantoux tests, were entirely negative. Multiple areas of rarefaction were visible in the roentgenograms of the skull, right



Fig. 9. G. S. Roentgenogram of pelvis taken November 6, 1936. Regeneration of bone has occurred in the areas formerly destroyed.



Fig. 6 G. S. Roentgenogarm of pelvis taken October 12, 1932. Arrows point to destructive lesions in right ilium, left pubes, and the femora.

clavicle, right humerus, right ilium, and left femur. There was also evidence of a pathological fracture of the right clavicle which had united with new bone formation.

On second admission in October, 1934, the patient still showed bilateral exophthalmos. However, the roentgenograms showed improvement, as the areas of rarefaction were less marked in the skull and long bones.

Re-examination in November, 1936, July, 1938, and December, 1938, gave no roentgenographic evidence of bone pathology. The skull, femora, pelvis, and ribs all appeared normal. Similar improvement was noted in the bone structure of the mandible and maxilla. The gingival tissues were in good condition. Malocclusion developed due to premature loss of deciduous and permanent teeth. The exophthalmos was scarcely noticeable.

Case 3. J. M., a male aged 1 year 11 months, was admitted to the Pediatric Service of the University of Minnesota Hospital in June, 1935. He had had polydipsia and polyuria of four months duration and at the time of admission, painful eruption of four deciduous teeth. There had been no previous illnesses except for chronic seborrhea which had persisted throughout infancy, and an attack of tonsillitis with bilateral otitis media at the age of 1 year 6 months.

Physical examination revealed an undernourished child weighing 10.5 kilograms. Seborrheic lesions were present over the head, scalp, and neck, with chafing around the external genitalia. Both auditory canals were filled with dried, grayish crusts. A mass was palpable posterior to the right ear. The cervical lymph nodes were slightly enlarged. Four deciduous teeth were erupting. Laboratory examinations demonstrated urine of low specific gravity without sugar, albumin, or acetone throughout the 11 months period of hospitalization. The blood had a hemoglobin content of 66 per cent. There were 3,370,000 erythrocytes and 7,150 leucocytes per cu. mm. Of the latter, 88 per cent were polymorphonuclears and 12 per cent were lymphocytes. The blood, Wassermann and Mantoux tests were negative. The values for serum cholesterol (238.7 mg. per cent) and total fatty acids (520.8 mg. per cent) were slightly above normal limits. The other lipid figures were as follows: lecithin, 244.5 mg.; cholesterol esters, 150 mg.; and free cholesterol, 88 mg. per cent. Roentgenographic examinations showed sclerosis and some areas of rarefaction involving both mastoid regions, and multiple areas of destruction in the skull and mandible. At no time could similar pathology be found in any of the long bones.

At the time of admission, the patient had marked polydipsia and polyuria with a fluid output of 5 to 6 liters per day. Dur-



FIG 7 G S Photograph taken November 9, 1936, at the age of 8 years 11 months The exophthalmos disappeared following several courses of roentgen ray therapy



FIG 8 G S Lateral skull roentgenogram taken November 6, 1936 There is no evidence of bone pathology.

ing periods of pitressin administration, the output was decreased to between 1 and 2 liters per day. Although the specific gravity of the urine did occasionally reach 1.020, the average level was below 1.005. Except for an occasional rise in temperature, the patient was afebrile up to the time of his terminal illness. During the last six months, he gradually developed bilateral exophthalmos

A striking oral condition existed in this two-year-old patient, for the dental cast showed a tooth erupted in the position of the upper right first permanent molar. This appears to be confirmed by the lateral roentgenogram of the skull. The crown of the tooth was formed but there was only slight development of the roots. Throughout the period of hospitalization, the patient had periods of exacerbations and remissions of the seborrheic dermatitis. During an exacerbation, the oral tissues were swollen, reddened, and were covered with a white film which was easily removed Since debris readily collected around the necks of the teeth, the clinical picture superficially resembled a Vincent's infection Unfortunately, bacteriological examinations were not made Despite continued oral treatment, the gingiva never appeared normal.

The patient died in May, 1936, 11 months after admission At postmortem examination, the pituitary gland was found to be completely surrounded, but not invaded, by fat-laden cells Similar cells formed a small tumor mass within the third ventricle, but the roof of the ventricle was intact Fat-laden cells were also deposited in the retrobulbar tissues and in the thymus gland

These three case histories illustrate some of the manifestations of chronic idiopathic xanthomatosis. The first patient demonstrated xanthomatous infiltrations of the skin. The outstanding feature of the second patient was the multiple skeletal defects and the marked exophthalmos, both of which disappeared following several courses of roentgen ray therapy. The third patient presented the classical triad: exophthalmos, diabetes insipidus, and multiple defects in the membranous bones of the skull. However, all of the patients were similar in giving an early history and clinical findings of gingivitis and looseness of the teeth. Possibly the premature eruption of permanent teeth in the last two patients was the result of alveolar resorption hastening the physiological process.

The mechanism of the disturbed water balance as illustrated by the third patient is subject to speculation. In the normal water metabolism of the body, the diuretic and antidiuretic hormones are balanced. In experimental work with dogs suffering from diabetes insipidus, Bourquin[18] obtained a diuretic principle from the corpora mammillaria. The same substance was found in the blood and urine of the experimental dog but not in normal animals. However, these findings have not been confirmed by other investigators. Both the pars intermedia and the posterior lobe of the pituitary gland are considered to be under central nervous system control through fibers originating in the nucleus supraopticus and nucleus paraventricularis. Polyuria may be caused



FIG 10 G S Photograph of dental cast taken November 10, 1936 Note the early loss of all deciduous teeth and the permanent molar and bicuspid teeth which had erupted prematurely.



Fig 11. J. M. Photograph showing exophthalmos and seborrheic lesions of the skin.

by injury to either these fiber tracts or their central nuclei. However, detailed postmortem examination of patient, J. M., showed the pituitary gland to be completely surrounded by masses composed of "foam" cells. The gland was not invaded by these cells. There was a xanthomatous formation also within the wall of the third ventricle. The cells of the hypothalamic and basal nuclei appeared intact. There was one small hemorrhage in the region of the right nucleus supraopticus and another hemorrhage within the substantia grisea centralis on the left side. The retrobulbar tissues were invaded by the xanthomatous cells. Therefore, it seems probable that



Fig. 13 J. M Roengenogram of jaw taken September 10, 1935 Arrow points to the defect in the mandible



Fig 12. J M Lateral skull roentgenogram taken June 15, 1935 Arrows point to defects in the calvarium The sella turcica is normal One of the upper first permanent molar teeth appears to be erupted

both the diabetes insipidus and exophthalmos in this patient were caused by pressure of the granulomatous cell masses.

SUMMARY AND CONCLUSIONS

Three case histories of patients suffering from chronic idiopathic xanthomatosis of the Hand-Schuller-Christian type are presented. The clinical recovery of G. S. following extensive roentgen ray therapy is most unusual. In this patient there was a marked improvement of the exophthalmos and a complete disappearance of the multiple bony defects that had lasted longer than two years. The last patient reported, J. M., did not show any improvement following similar therapy. Possibly the xan-



Fig 14 J M Photograph of dental cast showing an erupted upper right first permanent molar tooth

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thomatous masses found on postmortem examination surrounding the pituitary gland and in the wall of the third ventricle were too deep-seated to be reached by radiation. It is believed that the location of these granulomatous masses was responsible for the development of both the diabetes insipidus and exophthalmos.

Special reference is made to the oral pathology observed in these children. All three of the patients presented a gingivitis. There was also looseness of teeth and premature eruption of several permanent teeth in the last two patients. The occurrence of an otherwise unexplained gingivitis, loosening of teeth or premature eruption of teeth should call attention of both the dentist and the physician to the possible existence of an essential xanthomatosis.

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A Study of Infant Mortality in Montana

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IN any nation where the birth rate is declining, the importance of reducing to the minimum the number of infant deaths becomes very great. Also in any nation where the general problem of economics is acute, the reduction of infant morbidity to its minimum is a necessity. No one can accurately measure the human misery and suffering, or the economic loss, caused by prenatal, neonatal and infantile mishaps or diseases. There is no other problem with as great a challenge to so many physicians, because the great majority of infants are, and probably will continue to be, ushered into the world by the general practitioner.

The medical problem concerning the physical well-being of infants in Montana is reasonably typical of the Northern half of that large section of the United States lying between the Mississippi river and the Rocky Mountains. It is a sparsely populated state, yet the great majority of its people are ordinarily within two hours driving time from a hospital, and half that distance from a physician. In 1937, 95.7 per cent of rural and 99.8 per cent of urban deliveries were attended by physicians, and 62.4 per cent of all births were in hospitals.

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In their reports of 10,000 cases of pregnancy, Holt of Johns Hopkins reported a neonatal mortality rate of 3.1 per cent and Swanson of the Chicago Lying-In reported a rate of 2.6 per cent. In 1936, statistically an average year, 10,400 births were reported in Montana with a rate of 3.05 per cent. In 1937, there were 10,248 live births with a neonatal mortality rate of 2.8 per cent. The neonatal mortality in 1937 constituted 56.2 per cent of the infant mortality. The urban neonatal death rate was 2.4 per cent. Seventy-nine per cent of the neonatal deaths in Montana (U. S. 81 per cent) were classed as due to prematurity, injury, congenital malformation, or other prenatal and natal conditions. For 1938, the provisional figures for 10,715 live births indicate a neonatal rate of 2.6 per cent, or 60 per cent of the total infant mortality. The infant mortality rate in Montana during 1936 was the same as for the entire registration area of the United States for that year, 57 per 1,000 live births. In 1937, the rate was 50.5, and for the United States, 54.4. The provisional infant mortality rate in Montana for the year of 1938 was 44.7.

Some statistics from the United States Bureau of the Census for 1936 are both interesting and instructive. The urban infant mortality rate for Montana was 46,

for the United States 55. Six states—Minnesota, Oregon, South Dakota, Washington, Connecticut and New Jersey—have a lower urban death rate under the age of one year. The Montana urban infant mortality rate declined from 78 in 1922 to 46 in 1936. The rural infant mortality rate has been less satisfactory, its rate being 62 (U. S. 58). Twenty-eight states had a lower rural infant mortality rate than Montana. The year 1933 was the best on record for Montana, the rate being 42 for the urban and 55 for the rural communities. This has apparently been bettered in 1938. The economic distress so prevalent the last several years was responsible, in my opinion, for the increased mortality rates in 1934, 1935 and 1936. Just what other factors play a part is not known. Certainly, the great increase in the number of infants born to primiparous, as compared to multiparous, mothers is remarkable. In 1936, the number of infant deaths up to one year of age in urban areas was 25 per cent of the total, while the percentage of urban births was 31.4 per cent. Conversely, with 68.4 per cent of the births, the rural areas of Montana contributed 75 per cent of the infant deaths. In 1937, the urban areas contributed 34 per cent of the births and 29 per cent of the deaths, the rural areas with 66 per cent of the births had 71 per cent of the infant deaths.

In comparing some statistics from various counties of Montana, I wish to give the following totals for the years 1933 to 1937 inclusive.

County	Total Live Births	Infant Mortality Rate per M
Cascade	4,071	41
Yellowstone	3,872	64
Silver Bow	3,700	42
Valley	2,474	60
Missoula	2,363	39
Flathead	2,114	53

These figures bring up several questions:

1. Why should the infant mortality rate in Yellowstone county be 64 per 1,000 live births as compared with 42 in Silver Bow, which has only 172 less births, or Cascade county with a rate of 41 and 169 more births?

2. In Valley county in 1937 there were 20 infant deaths in 611 live births as compared to 40 infant deaths in 563 live births in 1935! How can this improvement be explained?

3. Why does Flathead county with 2,114 live births have an infant mortality rate of 53 as compared to Missoula county which has 2,363 live births and a rate of 39?

4. What factors operate to cause a relatively low rate in Silver Bow county?

In attempting to analyze these figures, it is reasonable to state that with the possible exception of Silver Bow county, there is no essential racial or sociologic difference in the population of the various counties. The first and fourth questions cannot be answered at this time. Careful studies of infant mortality carried on preferably through the county medical societies would probably reveal the answers to these questions. In my opinion, the marked improvement in the rate in Valley county is directly attributable to the splendid work of the nursing set-up instituted there in 1936 by the division of Child Welfare of the Montana State Board of Health. I think the reason Flathead county has a 25 per cent higher infant mortality rate than does Missoula county is because in Flathead county there is absolutely no public nursing service of any kind available. There are possibly other factors that play a minor part in the marked differences in the infant mortality rates, but I am sure a good public health nursing service saves some infant lives.

Any discussion of infant mortality would be much more authoritative, and any attempt to lower the infant mortality rate would be simplified if more careful studies were made in all cases and more postmortem examinations performed in the fatal cases. That it is not impossible to secure autopsies is shown by the reports from the Chicago Board of Health where the number of satisfactory necropsies in neonatal deaths increased from 35 per cent in 1936 up to 83.5 per cent in the first five months of 1938.[1] In about one-third of these cases, autopsy did not reveal the cause of neonatal death. Intracranial hemorrhage (22 per cent) and congenital malformation (15 per cent), were the most frequent causes of death. Pneumonia (8 per cent) and asphyxia (6 per cent), were also frequent causes in the Chicago statistics. An interesting point here is that according to the death certificates, only 13 per cent of the neonatal deaths in Montana in 1937 were recorded as due to birth injury or intracranial hemorrhage, as compared to 22 per cent in the Chicago study. In any attempt to lower infant mortality, it must be remembered that over one-half of all infants dying in the first year of life, die during the first two weeks, and three-fourths of these deaths are due to prematurity, injury, or other prenatal and natal conditions. In Montana in 1937, 26 per cent of the infant deaths occurred before the babe was one day old. This unquestionably implies that the obstetrical care is the greatest factor in the reduction of neonatal mortality. It has been stated that "the desirable attendant for the pregnant woman is a physician adequately trained and experienced, and so aware of his limitations that, when emergencies arise which are beyond his competence, he will not delay in securing help."[2] Prematurity is the basic reason for the death of many more newborn infants than is any other cause. The treatment is both prenatal and postnatal. No one can question Litzenberg's statement that "prenatal care should begin before marriage."[3] Many have emphasized the great need of care early in pregnancy.[4] In his studies on neonatal mortality[5] and on the reduction of premature infant mortality,[6] Clifford has well stated that obstetricians should seek to improve the infant's condition at birth by the more conservative and intelligent use of analgesics and anesthetics during labor, the selection of the best possible method of delivering the infant, and the better treatment of toxemias of pregnancy. I wish to repeat again that good obstetrical management of the mother is practically always good treatment for the babe. The most frequent neonatal causes of death, prematurity and accidents of labor, are connected with the obstetrical management. In the majority of cases, the actual gesta-

tional age of the infant, rather than the birth weight, determines the survival rate. I think the famous Dionne quintuplets bear out this statement. In practice, the gestational age and birth weight are usually closely associated. If by proper care of the mother the duration of pregnancy can be lengthened only a relatively short time, the greater will be the survival rate of newborn infants.

In the neonatal handling of premature infants, Hess has led the way.[7] Doctor Hess in his many articles has shown the value of the so-called "premature infant stations" in saving the lives of premature infants. With our modern, rapid methods of communication and transportation, even in the sparsely inhabited state of Montana, the establishment of several of these stations should result in the saving of a considerable number of lives yearly. The small portable incubator, with a thoroughly trained nurse to accompany it when sent after a babe, and the hospital "set-up" under competent medical supervisors can easily be procured at a relatively small expense in several of the larger cities in Montana, and I feel that the various medical, public health, and welfare organizations should join in this infant-life-saving program. The establishment of these stations in hospitals having a considerable number of obstetrical cases is preferable, for the procuring of breast milk for these premature babes is a highly desirable, many times a life-saving procedure.

In the actual care of a premature infant, I would emphasize the necessity of meticulous care in the following respects:

A. *Personnel and Equipment.* The greatest need of all in the treatment of premature infants are nurses who have received adequate specialized training in the care of prematures, and who realize and accept their great responsibility for the treatment of these infants. The medical care should be in charge of a physician interested in saving these small humans, and cognizant of their needs and methods of supplying these needs. The equipment may be very simple, but it is very important that there be some method for the reasonably close regulation of temperature and humidity.

B. *Isolation.* Premature infants are notoriously subject to any and all types of infection, and even a minor infection may bring a fatal ending. Cubicles or separate rooms are an essential. No one should be allowed to come in contact with the infant except the physician and the nurse. The physician and the nurse must be free from any respiratory, gastro-enteric, or dermal infection. Both must be conscientious, and have an intelligent conception of asepsis and cleanliness. *All* clothing, bedding, and utensils must be absolutely individual to the patient alone.

C. *Food.* Breast milk should be provided if possible. If this is not available, a simple, well considered formula with which the physician is familiar should be provided. My preference is for a not too dilute boiled cow's milk to which is added lactic acid and dextri-maltose. Frequent feedings of small amount are usually necessary, often only a dram every fifteen to thirty minutes. Ordinarily these can be given by dropper, sometimes by means of a Breck feeder. Rarely in my experience do I find it necessary to feed by gavage. It usually helps in feeding these infants, and also in having them retain their food, to keep the head of the crib constantly elevated five or six inches.

D. *Water.* Dehydration rarely is so pronounced in these infants that it necessitates the giving of intravenous, intraperitoneal, or subcutaneous fluids. In a viable infant, a good nurse can almost always supply the water need of the infant with a medicine dropper.

E. *Quiet.* The less these babes can be handled, the better. Too much nursing care may be as disastrous as is too little care.

All infant mortality rates, and especially neonatal rates, vary closely with the premature birth rates. Every physician should have at call assistance in their care. The success of the Hess method in Chicago warrants its trial elsewhere. Some few hospitals should be designated for the care of these premature infants, and provision made for adequately trained medical and nursing staffs and for the necessary proper equipment and rooms in these hospitals for saving the lives of more of these infants in Montana.

There has been some recent work on respiratory physiology that is of considerable importance to any one dealing with either premature or full-term newborn infants.[8,9,10] Some of these facts dealing with intrauterine respiratory movements were pointed out by Winslow over 150 years ago. Some of the points emphasized by these workers are:

1. Fetal respiratory movements are physiological, and with these movements there is circulation of amniotic fluid in the fetal lung.
2. The inhalation of carbon dioxide by the mother does not stimulate respiratory movements in the fetus.
3. Anesthetic and analgesic drugs markedly depress or completely stop the fetal respiratory movements.

Eastman and his co-workers at Johns Hopkins has shown that in the blood of the asphyxiated infants, there is a decreased oxygen saturation and an increased carbon dioxide tension.[11] We should remember that the mechanism of postnatal respiration is not a new function, that the treatment of apnea at birth is an attempt to preserve and continue a delicate mechanism already in existence. In these apneic infants, whether premature or full-term, be sure to do nothing to increase or aggravate the state of shock or collapse, no cold water immersions, shakings, etc. Body heat *must* be maintained. We should also remember that the need of these babes is for oxygen, not for carbon dioxide, of which they already have an over-abundance. Consequently, secure and maintain as clear a passage for the entrance of oxygen into the lungs as is possible. If necessary clear the passage by means of an intra-tracheal catheter. Oxygen must be supplied freely, and often for a prolonged period of time. The use of drugs, such as alpha-lobeline, or coramine, in the resuscitation of apneic babes may be, and probably should be used, although the results are not at all dramatic.

After prematurity, by far the next greatest cause of neonatal death are the congenital malformations. Relatively few of these, except those of the external parts

of the body which are usually not dangerous to life, are amenable to successful surgical therapy. In many of these cases, the death of the afflicted child is a happy relief to both infant and parents, and in my opinion, surgery of any type on these unfortunate infants, should be both well considered and conservative.

Pneumonia of infants will probably always be one of the most dreaded diseases. Until mothers and other relatives of the infant understand and appreciate that the prophylactic treatment of pneumonia, that is, the strict isolation of the child from any one with an upper respiratory tract infection, is an essential part of the hygienic therapy of childhood, the disease Osler termed the "friend of the aged" will continue to be the scourge of the infant. In the active treatment of most pneumonias in infants, the specific serum therapy has no great place. The immediate hospitalization of these infants with an oxygen tent instantly available is to my mind the treatment par excellence. As yet, the use of the newer chemicals such as sulfapyridine is of too recent origin for one to be able to make a positive statement as to their value in the treatment of childhood and infant pneumonias.

The gastro-enteric infections are the cause of relatively few neonatal deaths among Montana infants. The education of the mother as to proper and clean methods of feeding her infant, the superiority of breast over any type of artificial feeding, will save many lives. The larger percentage of infantile deaths in Montana are from the rural districts. The economic factor probably plays a large role, as is true the world over. Most cases of infantile diarrhea are also directly related to the intelligence and industry of the mother. As yet, no known newborn nursery in Montana has been afflicted with an epidemic of diarrheas among the newborn as has been reported from some Eastern hospitals.[12,13] There have been several other unreported epidemics and in all the fatality rate has been high. It certainly behooves every hospital, and every physician having contact with the newborn nursery in that hospital, to check over carefully the adequacy of the care of these infants. Too few American infants are breast fed to secure the minimum mortality rate possible. Rodda[14] especially has emphasized this to his many students and to physicians scattered over the Northwestern states, but sometimes one feels their memory is short, for there are far more babes fed artificially than necessary, and far too many symptoms of illness blamed on breast milk. There is too much attention paid to the initial weight loss of the newborn. Hunger is the best stimulant to vigorous nursing on the part of the infant, and this in turn is the best stimulant to secure the secretion of milk in the mother's breast. The too early giving of various formulas and mixtures to the newborn infant is a detriment because it eliminates hunger. Artificial stimulation of the breasts, especially by manual expression, is a great aid in many cases. For the continuance of an ample breast milk supply, the necessity of sufficient rest both physical and mental for the mother is not properly emphasized. We have all seen the sudden dwindling of the milk supply of a mother during a time of stress. The importance of breast feeding is sufficiently great to warrant sacrifice on the part of the mother and more careful attention by the physician.

While relatively few infants in Montana die of contagious diseases, it is during infancy that the greatest success in the use of vaccine is obtained. Therefore, I have felt a few words as to the contagious diseases are not out of place in this paper. In advising vaccinations for the various contagious diseases, any physician in private practice should be very conservative. He should advise only those thoroughly proven to be successful. The experimental work, with its great difficulty of running controls, belongs in the large teaching and research institutions. We can all remember the furore caused several years ago by the publication of Leake's article regarding the fatalities following active immunization against poliomyelitis.[15] Mothers are pessimists, and when one child is vaccinated or inoculated and later becomes ill with the disease supposedly immunized against, we have undoubtedly cost other children their chance of protection against other diseases for which we have a satisfactory prophylactic immunization. Every infant should be immunized against diphtheria and variola. I feel that in private practice the prophylactic treatment of scarlet fever and measles is not justifiable. The prophylactic treatment of pertussis is still experimental.[16] For that reason I do not use it as a routine measure in private practice, although I have no argument with any physician who may wish to do so.

In Montana, we have no legal means of compulsorily vaccinating any individual, including children before entering or while attending school. Also the enforcing of any quarantine regulation is either entirely or practically ignored in almost, if not all, of our smaller towns, villages and communities; consequently, our morbidity and mortality for all contagious disease is far above what it should be. Too many of our physicians neglect the constant education of the mothers that is necessary in order to get a high percentage of these children vaccinated. The remedy is to be found when we are able to elect an intelligent and informed public health minded legislative body that will put compulsory vaccination on the statute books.

As an aid in the lowering of infant mortality rates, hospital staffs and individual physicians should analyze their records of infantile mortality and morbidity, compare these with well known and recognized standards, and in that way learn their deficiencies and needs. In these studies, if they are to be useful, more adequate necropsies must be stressed.

In conclusion, I wish to quote from Zahorsky:[17] "The greatest danger to human existence is the danger of being born. The next greatest danger is the complicated adjustment to an extra-uterine life. Infant mortality of the first week of life is enormous, about 3 per cent, and in spite of all recent advantages of maternal care and the practice of obstetrics, this figure changes practically not at all. Our prophylactic measures seem to have their maximum efficiency, and further advances can only be made after a colossal change has been made in social conditions."

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NOTE: I wish to express my appreciation to Dr. Edythe Hershey, Director of the Division of Child Welfare, Helena, Montana, for her assistance in compiling the statistical data in this paper.

Rheumatic Fever in Children*

Evidences of Activity of the Infection and Notes on Various Therapeutic Procedures

Arild E. Hansen, M.D., Ph.D.†
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ONE of the most important problems we have today in the entire field of pediatrics is rheumatic fever. The devastating effect of this disease as shown by the high mortality rate and the physiologic crippling of its victims stands as a distinct challenge to the entire medical profession. Studies from various large centers such as New York City show that heart disease is the leading cause of death in girls of school age and second only to accidents in the boys. In the United States Registration Area, heart disease is the fourth largest cause of death in children of school age.[1] Dublin[2] states that a child of ten years has three times as many chances of dying from heart disease as from tuberculosis. For each death from heart disease, there are 10 to 17 patients suffering with the disease; whereas for each death from tuberculosis there are but seven patients with the disease. In Philadelphia in 1936 rheumatic heart disease resulted in more deaths in those less than 20 years of age than pertussis, measles, meningococcic meningitis, diphtheria, scarlet fever and poliomyelitis combined.[3] Kaiser[4] states that 1 to 3 per cent of all school children at any one time have rheumatic fever and 8 to 10 per cent of all school children at some time are afflicted with this disease. Our efforts to gain insight into the underlying nature of the disturbances in this condition have failed to bear the rewards attained in certain other pathological states. Until we find the proper combination for an effective therapy in this disease, we will continue to find that in a ten-year follow-up period about one-third of the children with rheumatic fever are dead and another one-third are cardiac cripples of various degrees.

*Presented at the forty-fourth annual session of the Sioux Valley Medical Association, Sioux City, Iowa, January 19, 1939.

†Department of pediatrics, University of Minnesota.

From the distinctly practical viewpoint on the care of children with rheumatic fever, we are faced with the problem of determining when rheumatic activity has subsided to that point where it is safe to remove restrictions. Unfortunately, this problem is not simple but rests upon one's clinical judgment to correlate many facts and to interpret them wisely. There are no set rules or criteria by which it is possible to determine the character or the degree of activity of the infection in rheumatic fever. In the Eustis Children's Hospital and Out-Patient Cardiac Clinic of the Department of Pediatrics of the University of Minnesota, we have followed the ensuing factors in our attempts to evaluate the activity of the infection:

I. *Symptomatology and physical findings or specific manifestations of rheumatic fever:*

A. *Joint symptoms.* Pain is the most consistent finding; may be tenderness and swelling, but redness occurs uncommonly. The extreme mildness of symptoms and the few joints involved are the characteristic features in children. Knee, ankle, hip, elbow and small joints are most frequently involved. Rheumatic arthritis is often not heeded as a serious symptom by both the parent and the physician. Lésque long ago said

that rheumatic fever "licks the joints and bites the heart."

B. *Subcutaneous rheumatic nodules* — a manifestation of rheumatic fever which frequently seems to foretell the grave character of future events for the patient and which is often overlooked by the examining physician.

C. *Carditis* (peri-, myo-, endo-, pancarditis). Two features of carditis which seem to stand out particularly are (a) the great frequency with which heart involvement occurs or is demonstrable during the acute phase of the infection, and (b) the relatively high incidence of carditis as the first manifestation of rheumatic fever. Eighteen per cent of a large series of cases had carditis as the initial manifestation of rheumatic fever.[1] Prostration, weakness, dyspnea, cyanosis, precordial pain, tachycardia, tic-tac rhythm, distant or muffled tones, murmurs and pericardial rubs, even outspoken decompensation are signs of carditis, but it is necessary to carefully examine the heart in all cases. Chronic valvular disease usually results from repeated attacks, seldom from one attack.

D. *Chorea minor* — easy to recognize when outspoken symptoms are present, but the mild and early cases are often overlooked. The use of finer tests‡ and pointed inquiry into the emotional status of the subject are points necessary to detect many of these cases.

E. *Skin manifestations.* Certain skin symptoms, erythematous (erythema multiformi, erythema nodosum, erythema annular, erythema rheumatica) and purpuric in nature are believed by some to be of possible rheumatic origin because of the frequency with which they occur during the course of rheumatic fever episodes.

F. *Respiratory and other infections* often initiate, precede or are associated with rheumatic episodes, such as pharyngitis, tonsillitis, coryza, sore throat, "flu", scarlet fever, nephritis, myalgia and inflammation of serous membranes such as pleura, lungs, peritoneum and also the appendix.

G. *General manifestations*—those which occur frequently in rheumatic fever, yet are not specifically characteristic of that disease alone, such as anorexia, malaise, weight loss, epistaxis, fever, weakness, "growing pains," pallor, sweating, prostration, lassitude, fretfulness, fever, rapid pulse, moderate leucocytosis, secondary anemia, and malnutrition.

II. *Cardiac findings*:

Distant heart tones, rapid heart rate, disturbances in rhythm, change in character of the cardiac impulse, enlargement of heart, presence of thrills, development of precordial rubs and murmurs with changes in their character are points to be considered when determining rheumatic activity.

III. *X-ray studies*:

These give one valuable information concerning the condition of the heart in the attempt to exactly evaluate a given case. Of special importance is the development of esophageal displacement by the left auricle in early mitral heart disease.

IV. *Electrocardiogram*:

This is an important procedure for use in determining evidence of rheumatic activity. Swift[5] states that 95 per cent of subjects during the acute phase of rheumatic fever show electrocardiographic changes indicative of rheumatic activity. The following changes are those most frequently interpreted as indicative of rheumatic involvement of the myocardium.

1. PR interval prolonged.
2. P notched, especially P_3.
3. Swift lead.
4. Pardee Q_3.
5. S-T interval not isoelectric, and more than 0.5 mm. elevated or depressed in relation to PR.
6. P_1&$_2$ and T_1&$_2$ negative.
7. P & T height more than 5 mm.
8. QRS complex, slurring, splintering, widening, M & W forms. Upper limit of normal is 0.1 sec.
9. Low amplitude of all waves.
10. Miscellaneous.

V. *Heart sound recording apparatus*:

This means of study of heart disease has been used in our clinic for the past three years. This device is proving to be particularly valuable as an aid in the teaching of heart disease to students, yet also serves as a means of obtaining a permanent graphic record. The success of this procedure is due to the diligent and persevering efforts of Dr. Paul Dwan of the Department of Pediatrics of the University of Minnesota. That this device may prove to have more than academic value seems probable in the light of recent observations which have demonstrated the presence of diastolic murmurs long before they were audible to any of the examiners.

VI. *Routine laboratory data*:

Hemoglobin, leucocyte and differential white blood cell counts also aid in determining rheumatic activity. A falling hemoglobin or failure to rise if previously low often may be the result of rheumatic activity. The leucocyte count has proven to be of relatively little value to us in following the progress of rheumatic fever subjects, especially in mild cases. Juster,[6] on the other hand, finds this to be a valuable guide in determining the activity of the infection in adult

‡Placing the child under an acute strain such as is used here, namely: Have the patient rest the palms of his hands squarely upon the examiner's, who holds his hands palms upward in front of him, and have the subject place his tongue between his lips without biting the tongue and then ask him to sit very still. Normally even a child of 3 to 5 years should be able to stay very quiet for a period of several minutes, whereas the child with mild chorea will have twitching of the face muscles and slight movements of the arms, fingers, or shoulder muscles.

subjects. A shift to the left as determined by the Schilling hemogram often aids materially in the detection of rheumatic activity.

VII. *Sedimentation rate of red blood cells*:

This procedure is probably the most useful of the routine laboratory procedures used in determining rheumatic activity. In our studies we have used the large Westergren tubes. We consider a falling rate in the neighborhood of 10 mm. in 60 minutes to be within normal limits. In many instances the recommendations in any given case rest upon the outcome of the rate of settling of the erythrocytes.

VIII. *Weltmann reaction*[7]:

This is another simple laboratory procedure, the usefulness of which we are attempting to evaluate in the determination of rheumatic activity. Diluted serum is added to ten test tubes containing concentrations of $CaCl_2$ from 0.1 per cent to 0.01 per cent and are numbered 1 to 10 respectively. The tubes are placed in boiling water and read after 15 minutes. Coagulation of the protein occurs normally in all concentrations up to tube No. 6 and this is then referred to as a Weltmann reaction of 6. In the presence of active infection we find readings of 1 to 5. Levinson, Klein and Rosenblum[8] made a comparison of the Weltmann reaction and the sedimentation rate in a number of different diseases, including rheumatic fever. We are attempting to ascertain the relative values of these two procedures in determining the degree of rheumatic activity by comparing the results obtained with other clinical data in various phases of the infection.

It is not possible to state any set rules or criteria for the management of the various manifestations of rheumatic fever. The more information available concerning any given patient, the greater is the degree of accuracy likely in the interpretation of the value of various therapeutic procedures used in this condition. It is well known that it is impossible to predict the outcome of any particular case, but by and large, the most efficient management will be obtained by evaluating the findings of the various laboratory procedures in the light of the clinical findings. Rather than attempt to summarize our data in complete detail by the extensive discussion of many cases, I shall endeavor to illustrate by example cases the points in our experience which seem worthy of consideration. For the sake of brevity we have so far as possible presented the various clinical and laboratory data in a diagrammatic way in order to obtain a comprehensive view of the case to facilitate our interpretations.

Case 1, J. B.—a 15-year-old girl (see fig. 1): Noteworthy in this case is the fact that evidences of rheumatic activity persisted for a period of two years coincident with the first attack of rheumatic fever. The development of mitral heart disease as occurred here is the most common by far of the sequella of rheumatic fever. Of special interest was the demonstration of a diastolic murmur by the heart sound tracing, shown repeatedly, but inaudible to any of the examiners. This feature of the possible predicting of murmurs by first eliciting them with a heart sound recording device is being studied in the Heart Clinic by Dwan and the author.

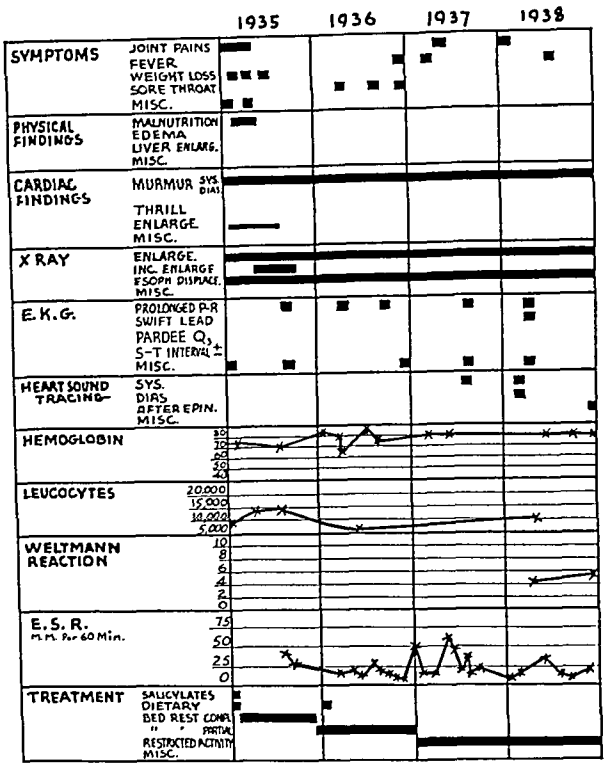


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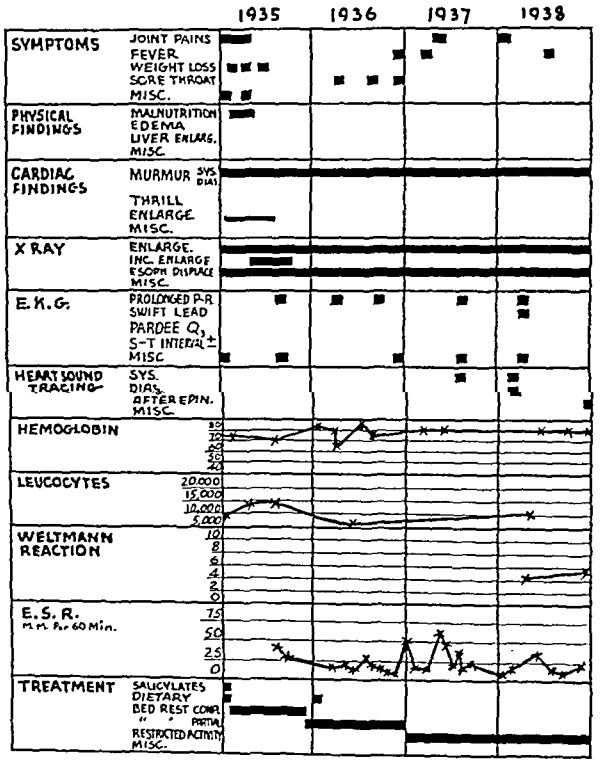


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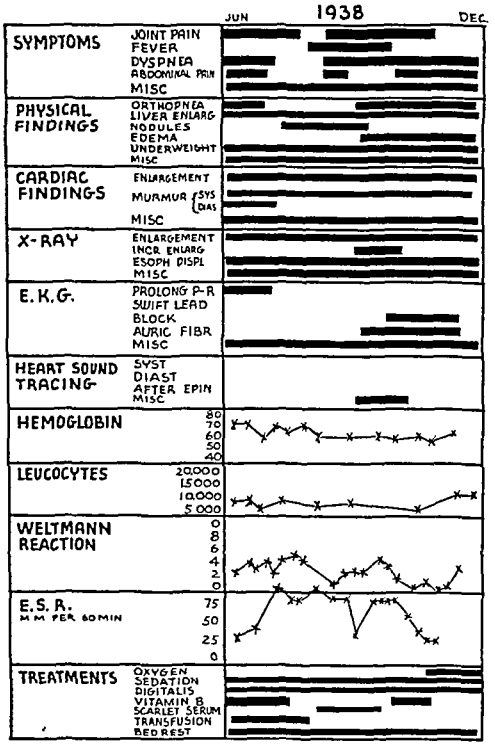


Fig. 2. R. A. 15 yrs. Admitted 6-20-'38. Pains in joints since 3 yrs. of age. Dyspnea 3-4 yrs. Never confined to bed.

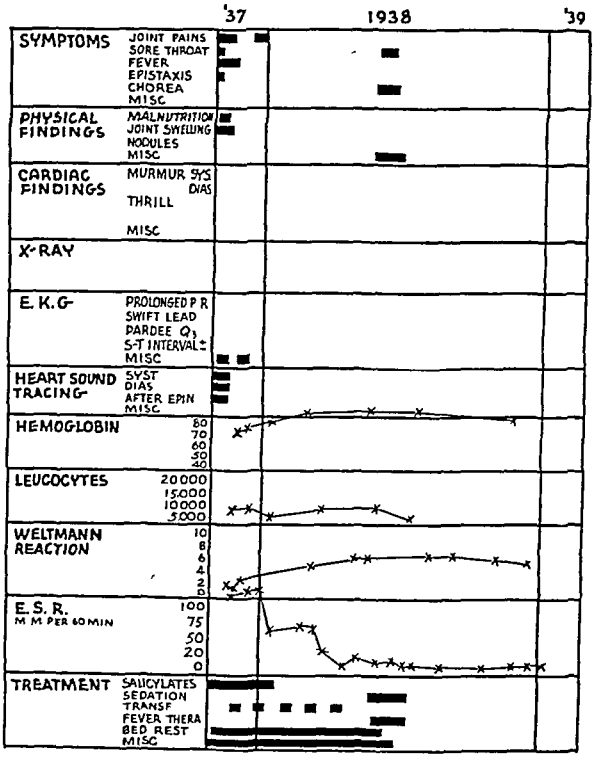


Fig. 3. L. V. K. 15 yrs. Admitted 11-27-'37. Attack tonsillitis 3 weeks before. Acutely red, swollen, tender, painful joints. Fever, weight loss, fatigue.

development of hemi-chorea which responded most dramatically to fever therapy with the Kettering hypertherm. Even after the first treatment, the patient herself noted an increased strength in her hands and a great improvement in her ability to control her muscular movements. All signs and symptoms of chorea disappeared after three treatments. So far the patient has escaped heart disease in spite of two episodes of rheumatic fever.

Case 4, G. F.—a 12-year-old boy (see fig. 4): After nearly ten years of a low grade smouldering type of infection, the diastolic murmur indicative of aortic regurgitation developed. Of the secondary signs of aortic regurgitation, the first to develop was the increase in pulse pressure. Capillary pulsation and water-hammer pulse were late in developing, but particularly significant was the fact that in spite of the aortic lesion being present for at least seven years the heart showed no enlargement, whatsoever, by X-ray. Streptococcic vaccine was used for a period in 1933, but its effectiveness was difficult to evaluate. This case again demonstrates the usually good prognosis of pure aortic regurgitation.

Case 5, G. N.—a 7-year-old girl (see fig. 5): Again we have an example of the futility of various therapeutic measures such as bed rest, sedation, salicylates, oxygen, digitalis and multiple direct blood transfusions in the extremely ill child with pronounced cardiac symptoms with active rheumatic infection. The child was kept in oxygen continuously, a matter which was of some concern to the bookkeeping office when the charges for this item alone totaled over $1500 after a period of several months. In addition to this, it was necessary to use opiates as a sedative until the subject became entirely dependent upon this type of medication for relief of the symptoms of pain and dyspnea. During this time for several months the child ran a subnormal temperature, even to 94 F. (rectal) and suffered from marked anorexia. It was after several months of futile efforts in obtaining any improvement that Dr. I. McQuarrie, chief of the pediatric service, suggested that thiamin or vitamin B_1 in large doses be tried, as Weiss[10] had recommended for adults with heart disease. Two thousand international units, or 6.6 mg. of thiamin were given subcutaneously daily for one week, then 1 mg. doses were given by mouth. In the next few days the most decided and strikingly drastic change that we have ever witnessed in the clinical picture of a child with rheumatic heart disease occurred. In a short time the dyspnea and orthopnea disappeared, the liver began to shrink in size and the edema vanished; within another day or two the appetite returned and there was a smiling, happy child in place of the miserable, suffering girl of the past few months. The cardiac outline as demonstrated by the 6 ft. plate also decreased definitely during this one week interval. Her heart lesion is still present, but her general condition has remained quite satisfactory this past one and one-half years. This shows that deficiency diseases may develop in spite of hospital care and that even in children, thiamin in large doses may prove to be a life-saving medication.

Of all the various therapeutic procedures used in rheumatic fever and rheumatic heart disease, the only one which meets with universal acceptance is *bed rest.* The question most frequently asked is "How long shall the child be kept in bed?". In general it may be said that six weeks' strict rest in bed after all signs of activity of the infection have disappeared is a comparatively safe, but admittedly elastic rule, to follow. The most important question again is, "What are the signs of activity of the infection?". As stated previously this is best answered by a thorough review of the history and laboratory data, which in turn, must be interpreted in the light of the clinical findings in each individual case. Briefly, the most important of these features, which have been discussed at length above, are as follows:

I. *History:*

Epistaxis, joint and muscle pains, nervousness, emotional disturbances, anorexia, weight loss,

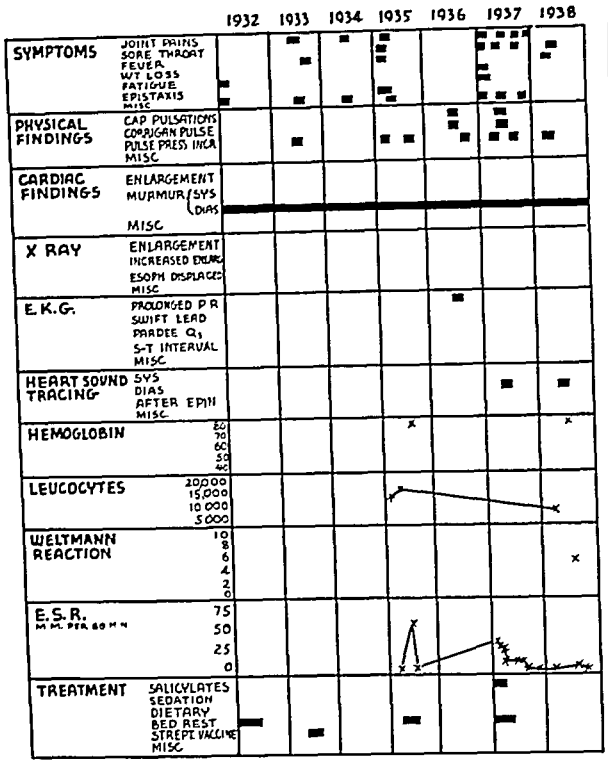


Fig. 4. G F. 12 yrs Admitted 7-5-'32. Painful stiff joints at 2½ yrs Past 6 yrs periodic attack joint pains, sore throats, fever, fatigue, anorexia, epistaxis.

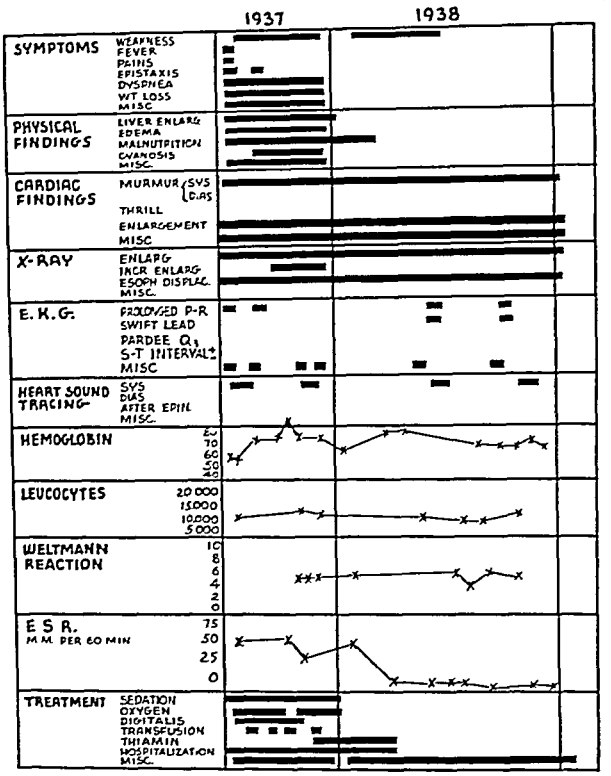


Fig. 5. G. N. 7 yrs. Admitted 6-11-'37. Weakness, anorexia, weight loss, pallor, epistaxis, also some pain in hips beginning March, 1937.

prostration, weakness, lassitude, malaise, fever, frequent upper respiratory infections, precordial pain, and dyspnea indicate that the infection is still active.

II. *Physical findings*:

Malnutrition, subcutaneous rheumatic nodules, pallor (out of proportion to the anemia), tachycardia, choreiform movements, accentuation of murmurs, muffling of heart tones, presence of precordial rubs, weakness, sweating, rheumatic skin eruptions, cyanosis, signs of cardiac decompensation, and cardiac irregularities are the physical signs which signify activity.

III. *Laboratory data*:

Development of evidences of rheumatic involvement of the myocardium as shown by electrocardiographic tracings; development of enlargement of the heart as shown by 6 ft. plates and esophogram on X-ray examination; low or decreasing hemoglobin; leucocytosis; shift to left by Schilling hemogram; persistently low Weltmann reactions; and other things being equal, probably the most important of the various laboratory procedures, rapid sedimentation rate of the red blood cells are the laboratory procedures which aid one in determining activity of the rheumatic infections.

Other treatment during this period of bed rest for the most part is symptomatic. No specific measures have as yet been devised to combat the infection itself. Resumption of activity should be gradual, such as sitting up in a chair for one-half hour twice daily for one week, then increase this by 15 minutes daily until the rest in bed is equivalent to a nap in the late morning and a long nap in the afternoon. After about two weeks, allow bathroom privileges and increase the indoor exercise periods 15 minutes daily for two to three weeks; then allow the child to go outside. With the gradual resumption of activity, most important is the effect on the patient and on the various laboratory tests, and these results, subject to the clinical judgment of the physician, will indicate the future handling of the case. It is to be remembered that the average rheumatic fever attack lasts about four months; however, there is a great deal of variation in individual cases. General hygienic measures and careful selection of the dietary needs of the subject with prophylactic and symptomatic treatment of any deficiency are obvious features of proper care. According to a number of investigators, the indications for removal of the tonsils and adenoids are the same as if the rheumatic infection had never occurred. If removal of the tonsils and adenoids is deemed advisable, it is best to wait until several weeks after all signs of rheumatic activity have disappeared.

Even with the numerous therapeutic procedures used in rheumatic fever, one is usually left with the feeling of frustration as regards the general success of treatment in this condition. It appears that the best therapeutic measure so far known has been pointed out by nature herself, namely, that this disease varies greatly

in its geographic distribution. However, the impracticability of sending children with rheumatic fever to warm climates, such as Porto Rico, Cuba, Southern Florida, in the overwhelming majority of instances is too obvious to stress to any extent.[11] The need for a specific chemotherapeutic agent in rheumatic fever has long been recognized. When the effect of sulfanilamide became known, it was not long before it was recognized in many parts of the world that this remarkable agent was without benefit in the acute phase of this disease. The efforts of Dwan and myself to use sulfanilamide as a prophylactic agent for administration in the period of quiescence in rheumatic fever in a small series of cases has been discouraged by the increasing number of reports of the toxicity of this drug. However, the encouraging recent report of Coburn[12] offers a hope for the prevention of the worst feature of rheumatic fever, namely, that of the profound tendency to recur. It is the repeated attacks of the disease which cause it to be so destructive. Coburn administered 2 to 3 Gm. of sulfanilamide daily for a period of six months or more to three different groups of children with rheumatic fever. In 79 of the 80 subjects there were no signs of a flaring-up of the rheumatic symptoms during this time. It is hoped that this promising lead will be borne out by more extensive investigation.

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Cerebral Palsy*

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"It can never be realized too widely that deformity is an unnatural and preventable affliction which treatment may alleviate or cure, but which a more complete understanding could abolish."—SIR ROBERT JONES.

DOWN through the ages historians have recorded the happenings of their day. Hidden among the thousands of words that make up the archivial records, a reader will find references to persons with malformed bodies; cripples whose distorted physical beings have made them the object of comment and sympathy by the physically fit. Ancient tomes record the unceremonious disposition of maimed persons. Three thousand years ago cripples were not permitted to live. Roman fathers of a later date were permitted, with the assent of five neighbors, to put crippled children to death. They purchased gaily decorated caskets, placed their deformed babies within and set them adrift on the waters of the Tiber. Oriental people turned their cripples out to wander in the wilderness; in ancient India they were cast upon the Ganges, and the early Greeks were accustomed to destroy their imperfect citizens, to maintain a racial physical superiority. The Athenians allowed their crippled children to die of cold and neglect while the Spartains took theirs to the hilltops and killed them.

In more modern times the distorted body was looked upon as a thing to be avoided and feared as if possessed of an evil spirit. In our early American history there are references to individuals born physically imperfect or with bodies twisted from the ravages of diseases who were thought to be the perpetrators of many acts of witchcraft. Down through the ages, even to comparatively modern time, the plight of the cripple has rarely been judiciously considered. Previous to the turn of the twentieth century, handicapped persons were looked upon with distaste, as some thing unclean that should be avoided. Spasmodic interest during the early 1900's brought increased recognition of the possibility of alleviating the effects of crippling diseases such as infantile paralysis and arthritis. After the holocaust of 1914 to 1918, the desolation of the maimed was brought to the attention of the general public through the return of many men who bore battered bodies as marks of their efforts in behalf of "Democracy". Then and not until then, though thousands of years had passed, was the world in general awakened to the needs of less fortunate persons.

It is the hope of the writer to present a word picture that will serve as a means of enlightenment on a problem that has long been the unhappy source of agony to many. In most every community there are some characters whose halting gaits, incoherent speech, and nervous reactions have branded them as not quite sufficient mentally. It is a study of this particular type which I will attempt to interpret for you. In many of these cases, the mentality is not impaired. It is only a lack of coordination between mind and nerve centers or motor control that makes the victim slow in carrying out the dic-

*Editor's Note: This paper presents the viewpoints of a lay individual who has spastic cerebral paralysis.

tates of the mind. Desperation in trying to speed up the process merely confuses and thwarts the spastic person, causing facial reactions that are construed by many to indicate idiocy or imbecility. Unsympathetic and injudicious denunciation by normal persons seriously injures what we choose to call "feelings" of the handicapped person. You can readily imagine the unhappiness that is caused; the barbed knife that is twisted in the soul of the victim. I know, *for I am one of them.*

I belong to that all too vast army known as "spastics" but which should be properly termed victims of cerebral palsy. A word about myself will be excusable, I am sure, and must be inserted to lend authenticity to the information and beliefs contained in this article. Born of average American parents, my early life was naturally curtailed because of my infirmity. Graduation from high school was accomplished only after a very laborious process. After matriculating at the University of Minnesota I immediately set as one of my goals the dissemination of all procurable information pertaining to my affliction. The following will be a summary of my deductions and recommendations. I trust that they will aid future recognition of the truth about spastics. Let me add that at present I am employed by *The Minnesota Association for Crippled Children and Disabled Adults* located in Minneapolis, Minnesota.

Ardent search and diligent study of all books, pamphlets and treatises on the subject of "Spastic Paralysis" has disclosed to me that there is an astounding lack of dependable, scientific information on the subject. This is doubtless attributable to several reasons, chief among which is the fact that, until quite recently, even the medical profession failed to differentiate clearly between the mentally defective "spastics" and those whose mentality is normal. As was stated above, in all cases the lack of motor control is marked, conveying the erroneous opinion that all spastics are imbeciles or idiots. This is far from the truth. In the preface of a recent book on "Spastics" it is stated that, "It is common knowledge that some of the world's finest minds are housed in athetotic bodies, whose every expression and movement belie the fact."

Corrective measures and treatments applied to "spastic cases" are of comparatively recent origin. The meager progress thus far made compels us to recognize that the treatment of this baffling affliction is largely in its experimental stage. I have searched the works of the known authorities on this subject, but, without depreciation of their efforts, I must confess that I have gained a far greater fund of information directly from physicians and psychologists, some of whom, at my request, have contributed articles summarizing their views as gained from practical experience. Serious discussion with others afflicted with "spastic paralysis" has shaped many of the views which I now hold.

Types of "Spastic Paralysis"

As before stated, the term "spastic paralysis" is a misnomer. The term cerebral palsy is perhaps more accurate. Dr. Earl Carlson,[2] director of reeducation, Neurological Institute of New York, seems to suggest that there are three types or groups of cases: (a) Those cases where the brain structure has been destroyed beyond repair; (b) cases where the brain remains normal, but motor control is partially or completely lacking, and (c) cases belonging to the second group where the mental and physical defects grow progressively worse.

Historical Observations

An estimate by Dr. Irving S. Cutter of New York indicates that there are approximately 150,000 children born dead or who die shortly after delivery in the United States each year. About one-half of these deaths may be traced to pressure damage to the brain at natal attendance. While cerebral paralysis may result from an injury after birth, it is thought that most cases are traceable to birth injuries to the brain.

In 1861 at a meeting of the Obstetrical Society of London, Dr. W. J. Little asserted that a large percentage of mental deficiency was caused by pressure damage to the brain at time of birth. These views served as an inspiration for the work done by Dr. Edgar A. Doll of the Vineland Training School of New Jersey whose studies have been compiled in his splendid book titled, "Mental Deficiency Due to Birth Injuries," published in 1932. Assisting Dr. Doll in this work were Dr. Phelps and Ruth Taylor Melcher, research assistant of the Training School at Vineland. Noting the dates of the foregoing statements, it will be seen that the science of the treatment of spastic cases is comparatively new. Placing stress on avoidance of birth injuries is judged to be necessary by the medical profession.

Dr. Doll says, "Motor reeducation might affect physical development two ways. First, by educating nerve centers to perform the natural duties of those destroyed. Second, by eliminating the bizarre cortical habit patterns which have been established and substituting in their stead more normal, similar patterns of muscular activity. Mental improvement, in turn, might result from a release of means of ideational expression. Obviously, the relative importance of the three possibilities of improvement varies significantly with the age of the patient. If treatment is begun in very young children, no cortical action patterns have as yet been developed. The problem there is to establish the proper patterns and insure as complete opportunity for the expression of mental growth as possible, rather than to raise patterns already established and substitute for them other patterns. However, the problem of cooperation in young children is so much greater than that in older ones that the difficulties of the two ages are about equal. Physical improvement in adults is often more astonishing than that in children, as the conditions have been fixed for so long a period of years that the patients do not believe any change can possibly take place. Mental improvement has also been observed in older patients."

Reviewing the preamble to this article, we aver that not many years ago the spastic was regarded as being possessed of the devil. Two thousand years ago such a handicapped person was destroyed; five hundred years ago he was ostracized from society; one hundred years ago he was only endured; and only within the past brief

fifty years has society attempted to salvage the handicapped. Many articles have been written that review effectively the story of the change in social attitude toward the defective and deformed person.

CHARACTERISTICS OF "SPASTIC PARALYSIS"

The Physiological Management of Childern Handicapped by Cerebral Palsy, a pamphlet issued in 1929 by Dr. Bronson Crothers of Harvard Medical School, a comprehensive study of the characteristics of "spastics", describes four main types of disturbances which may occur as a result of injury to the brain either at or following birth. (1) *Injury to the cerebellum,* such as results in confusion of motion. This type of injury is characterized by failure of the muscles to coördinate, producing an unsteady gait and violent, spasmodic contraction of the muscles. According to Dr. Crothers, this type of spastic paralysis is likely to become progressive and calls for constant treatment, at least in the early stages. (2) *Injury to the basal ganglia.* The function of these cells is highly important as it is supposed that they control the coördinate muscular movement. Characteristics of injury of these ganglia are impediment in speech, stuttering, drooling, difficulty in swallowing and definite facial contortions. Dr. Crothers states his belief that persons with this type of disease are not mentally deficient. (3) *Injury to the cortex of cerebral hemispheres.* If injury results in a lesion of the motor cortex the defects resulting are characterized by a stiffness in muscular control followed by intervals of exaggerated movements. (4) *Injury to brain area affecting intelligence.* Victims in this classification are definitely in the minority.

It is apparent from the above that it is not a simple task to classify a spastic accurately in the classes enumerated. The prognosis is not hopeless, except in the fourth class where intelligence has been too greatly impaired. It is the belief of Dr. Edward T. Evans of Minneapolis that there are two main types of spastic paralysis: the hereditary type and the acquired type. He states that the acquired type is usually the result of cerebral hemorrhage, adding that while considerable is known about the acquired type, very little is known about the hereditary type. He grants, in fact, that there may be even a dispute as to whether or not there is a true hereditary type.

Returning to Dr. Doll's statements regarding cerebral injuries at birth, he says they may result from some abnormalcy or subnormalcy during the term of pregnancy; the duration of labor; the fetal presentation; the use of instruments; deficient animation or artificial respiration.

METHOD OF TREATMENT

The term physiotherapy best describes the most feasible method for treating spastic paralysis victims. Physiotherapy is applied to the finer movements of the muscles through the medium of heat and massage and exercise. Space limitations prevent elaboration here as physiotherapy is definitely a field by itself.

Dr. Earl Carlson, a spastic himself, feels that the main problem of reëducation is to salvage the "undamaged residue," and he lays stress on the fact that there is a tendency to "overrate the handicap and to undervalue the undamaged residue."

Mental Attitude: Too much stress cannot be placed on the importance of the patient's mental attitude. Unequivocally the attitude of a spastic is one of moroseness. This is easily understandable but little improvement can be accomplished until a spirit of optimism is created. Tedious training in determination and will power to overcome the deficiencies is necessary. It will be of prime value to treatment if the patient can be taught to ignore the deficiencies. Assumption of an air of cheerfulness will follow but the procedure is one that requires much ingenuity and persistence. As accomplishment manifests itself, a natural reaction is the minimizing of the deficiencies on the part of the patient.

Motor Control: Effective aid can only be acquired through the control and coördination of the muscles. Here the art of relaxation is of chief significance. Drs. Evans, Carlson and others recommend the use of poems and music to promote rhythmic movements.

Emphasis on treatments to promote "muscle balance" through gymnasium work, standing, walking and climbing is advocated by those in charge of the Curative Work Shop in Minneapolis. Superficial muscular exercises, as well as the deeper muscular treatments, including the extending and flexing of joints have brought marked advantages at the Minneapolis institution. Coordination of muscles is promoted at the Curative Work Shop also by Occupational Therapy which includes the manipulation of mechanical devices and the performance of various tasks requiring a higher or lesser degree of skill.

In the matter of stuttering, which is recognized as a form of spasticity, a novel form of treatment has been devised. The stutterer stands before a mirror and attempts to stutter voluntarily. This has a tendency to build up a resistance against stuttering. This may sound somewhat paradoxical but the opinion is that stuttering is a "deep-seated neurological disturbance of the central nervous system." The above described treatment has shown substantial results. The application of mirror-controlled treatment in the training of victims of spastic paralysis so as to include arms, legs and general body movements would be very interesting to study.

Hydrotherapy: Devised originally for the treatment of poliomyelitis, hydrotherapy has been found to have a definite part in assisting spastics. Immersing in water has a first result that makes itself apparent at once. A sense of complete relaxation and repose is evident, which is highly essential. This, plus added ease of movement of the limbs through the buoyancy afforded by water encourages continued effort. Naturally the incentive of the treatment, being a form of play, adds to its usefulness.

Electrotherapy: The effective results of the various light rays upon the nervous system is not fully known, but, as applied to spastics, it produces marked benefit by

inducing relaxation so essential to the physical reëducation of the handicapped.

Occupational Therapy: This type of treatment is briefly covered in the discussion relating to motor control heretofore mentioned. Work carried on in this field has produced some remarkable results and a discussion of the complete field and its vast potentialities should be the subject of a complete treatise in itself.

Surgical Treatment: The treatment of spasticity through surgery has been attempted with varying degrees of success attending the effort. Dr. Doll calls attention to the fact that the first surgical treatment for this was by means of tenotomy. Cutting of the tendons to relieve contracture of muscles too often was found to produce opposite results and was soon replaced by a method of lengthening tendons which proved much more successful.

A German orthopedic surgeon, Dr. Stoffel, adhered to the procedure known as severance of the motor nerves and achieved a high degree of success. Dr. Edward T. Evans of Minneapolis has followed this general practice with marked advantageous results. A partial description of the method used by Dr. Evans includes this information: "It embodies the severance of motor nerves in direct proportion to the amount of activity which, by careful observation appears to be present within one particular muscle. . . . The severance of two or three of these motor nerves results in proportionate weakening of the calf muscles and this, in turn, releases the contracture. It is necessary at times to surgically lengthen long-standing shortened muscles by direct attack thereon."

Personal Observations: It is difficult for the normal person to comprehend the emotional experiences of a spastic. Irving S. Cobb's observation that, "The life of a celebrity is a life of a goldfish," is even more apropos to the spastic. He lives in a veritable glass house with the world peering in at him with never-ending curiosity; and from which he looks out upon a world which does not understand him.

My early life was most difficult. I feared that I would fall when walking or that I would drop an object; my greatest fear was that a spasm would seize me in the presence of others, resulting in untold embarrassment. Previous to my school days, those around me were my family, other relatives, and close friends. These people were very kind and understanding; they treated me exactly as one of themselves. It was when I entered school that my actual misery began, for then came realization of how tremendously unlike other children I really was. Normal healthy children can be so painfully cruel in their taunting. I suffered from the moment I entered the school yard in the morning until I returned to my home in the evening. And even then the dread did not leave me, for tomorrow was another school day.

My family did everything in their power to make my life easier. All through the years, I had every medical attention possible. Numerous types of treatments were prescribed but none was successful. Because I had failed to have the proper education and training necessary to a spastic in my early life, I became oversensitive and developed an inferiority complex. (This was my worst enemy to conquer). My only thought was that I was doomed, sentenced to an eternity of isolation. With the vision of such a future stamped on my brain, I had a great bitterness added to my ever growing feeling of inferiority. Because my appearance caused a wave of curiosity and aversion, I lacked the companionship of children my own age. I could not associate with older people, and I was self-conscious in any society. At about the age of twelve, when my handicap became extremely glaring to me, my mind dwelled on my affliction to such an extent that I grew steadily worse. Always feeling the gaze of others on me, I became even more spasmodic. The lack of proper training to confront this was the underlying cause. I recall noticing particularly that I could not control the stubborn muscles in the presence of others, but that when I was alone, the control reached near perfection. Now at a much later date I can see the reason. In the presence of others, my first impulse when I felt a spasm coming on, was to hold myself even more tense, in trying to avoid conspicuousness. Naturally my muscles became tighter and tighter until they were as taut as piano strings, stretched to the point of breaking. From this there was but one release. One would think the entire store of volition impulses within the central nervous system had been set loose.

When semi-maturity arrived, I became impatient because of the lack of control. There *must* be a way out. I never gave up determination. I recognized that I must master fear, and I tried harder than ever before. I was not going to be classed as a hopeless case. I adopted an attitude of disregard for the doubts of other people. After an extremely trying, laborious time, beyond the expectations of other people, I was graduated from high school. That was a great day in my life. I became cognizant of the fact that knowledge was power, and power meant overcoming fear. I was eager to continue my education even against the doubts and advice of others.

I argued that knowledge would give me the self-reliance I so sorely needed, and enrolled at our State University. At this time I also received the muscle training which I should have had in my early life and which is the only effective type of training for cerebral palsy cases. Soon I noticed a gain in self-confidence. I learned that it was possible to forget oneself and to relax. I became immune to the curious gaze of others, and realized that all my mental powers must be directed toward warding off these nervous explosions. At last, I conquered fear! The sensitiveness and feeling of inferiority waned. I assumed an air of nonchalance and cheerfulness. I cultivated my pride; my mental and nervous control.

I have done and will continue to do everything in my power now to accomplish at least one thing more. I want more than all else in the world to have people understand the spastic and his emotions; to have society cease regarding the victim of cerebral palsy as a curiosity and begin treating him as a normal human being.

I have overcome my difficulty, but I am thinking now of the thousands of children who have the molding of their lives before them. With the proper guidance, they can become useful members of society.

During my employment with the Minnesota Association for Crippled Children and Disabled Adults, I have become cognizant of a constant attempt by persons actively interested in work among all types of cripples to clarify previously shrouded opinions. It is the hope of the association, according to Jean Pierce, executive secretary, that soon a certain percent of the association's budget may be used for special study of the plight of the spastic and perfection of methods of handling the variated problems which these victims face.

I should like to quote here, Miss Pierce, who is so sincerely interested in this work: "I fully believe that if the medical profession and the lay public as well as those persons in this work who have never made a specific study of spastics, will only come to realize that there is a vast difference between mere lack of motor control and definite imbecility, then and not until then will the true value of reclamation of the spastic body be recognized. I have seen many cases so vastly improved by association with, and treatment as, normal beings that the main difficulty is obvious. My word to whomever interested is, in regard to this, belief in the spastic person and willingness to lend a helping hand will prove that a vast number of persons previously relegated to the ranks of imbecility can be reclaimed for a world that direly needs them. We have proven it through Lone Craftsmen work."

CONCLUSIONS AND RECOMMENDATIONS

I have reached some definite conclusions about cerebral palsy which are as follows: (1) Medical science should direct its efforts toward the prevention of this affliction by encouraging research and further experimentation with corrective treatments. (2) Special training during elementary school years that will instill the cerebral palsy victim with the desire and means of acquiring economic security and independence should be provided. This should be a federal responsibility. (3) Closer study should be made of the characteristics of the four types mentioned by Dr. Crothers. Research will reveal that in a great percentage of cases, incarceration in a feeble-minded institution is not only the wrong solution, but a genuine act of cruelty.

To my mind the only really effective type of training or treatment for victims of cerebral palsy is muscle training. The patient should be examined by an orthopedist and enrolled in the nearest workshop that really understands this type of affliction. Some hospitals have the accommodations to present this type of treatment. In a remote community where such accommodations are not available, a book by Percy Merritt Girard, M.D., *Home Treatment of Spastic Paralysis*, published by J. B. Lippincott Co., will prove extremely beneficial.

As Gaynor once wrote, "You cannot force the growth of human life and civilization any more than you can force these slow-growing trees. That is the economy of Almighty God, that all good growth is slow growth."

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(f) Newspaper clippings; columns of medical comment.

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Embryonal Adenosarcoma of the Kidney*

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ONE of the most frequently occurring malignant tumors of infancy and childhood is the rapidly growing neoplasm of the kidney referred to by Birch Hirschfeld[1] as embryonal adenosarcoma and by Wilms[2] as mixed tumor of the kidney. The first genuine case reported seems to have been that described from the pathological viewpoint by Wollstein[3] and from the clinical viewpoint by Abbe.[4] Since that time many of these tumors have been recognized. The present paper deals briefly with the findings in eight cases observed at the University of Minnesota Hospitals during the past decade. For comparison and for the sake of emphasis, several series of previously reported cases are also presented.

Pathology. Embryonal adenosarcomas are derived from fetal rests and may contain different types of tissue in varying degrees of differentiation. They grow from any part of the kidney and compress the kidney substance, soon breaking through the capsule to infiltrate surrounding structures. They may be hard, or soft and vascular containing many areas of necrosis and hemorrhage. Microscopically, the neoplasms are embryonal in type, containing, most frequently, adenosarcomatous tissue; but smooth muscle, striated muscle, and epithelium are commonly seen.

Incidence. Dean and Pack[5] in reporting a series of 16 cases from the New York Memorial Hospital for Cancer and Allied Diseases, stated that these tumors represented 0.096 per cent of malignant neoplasms seen in that hospital. Priestley and Broders[6] reported that such cases comprised approximately 0.007 per cent of all admissions to the Mayo Clinic.

Age and sex distribution. As indicated in Table I, almost all Wilms tumors occur in children under the age of 15 years. In fact, the majority of them appear before the fifth year. Five of the eight cases seen at the University of Minnesota Hospital were in children under 5 years of age, while the other three were in children between the ages of 5 and 10. In Wollstein's[7] series, more than a third were recognized during the first year of life. Many cases of mixed tumors have been reported as occurring in premature and full-term newly-born infants.[7,8] On the other hand, Dean and Pack[5] report that one of their cases was 37 years of age at the time of nephrectomy.

There is no appreciable difference in the sex incidence or in which kidney is affected by the tumor. (Table I.) It has been reported as bilateral in a few cases, but it is difficult to prove that these do not represent a primary tumor in one kidney with metastases to the other. In one of our cases, at operation, a mass was found in each kidney, that on the right being considerably larger and, in all probability, the primary tumor.

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Initial symptom. The initial symptom of the tumor is, in the majority of cases (Table II), a slowly enlarging abdomen or a palpable mass first noticed by the parents. Pain is the next most common manifestation. Hematuria is occasionally observed, but it is rarely the first symptom. Hinman and Kutzman[8] report, in addition to those noted in Table II, initial symptoms in some cases, of vomiting, icterus, diarrhea, constipation, ascites, and cough. In the 17 cases of the Children's Memorial Hospital, Chicago,[9] palpable tumor was reported as the initial symptom in the majority. Two of the 65 cases reported by Priestley and Broders[6] presented an unexplained fever, while seven first complained of irritability, anorexia, constipation, and restlessness. Dean and Pack[5] noted one case with the initial symptom of urinary frequency, while one of the cases in Wollstein's[7] series first presented a digestive disturbance. Physical examination of this child revealed a palpable mass already present in the abdomen. In one of the cases from the University Hospital, the parents stated that the child had had a slowly enlarging abdomen for one and one-half years, but only in the preceding two weeks had it increased in size rapidly. The phenomenon had been first noticed shortly after birth.

General symptoms. Practically all cases of Wilms tumors show, sometime during the course of the disease, a palpable tumor mass (Table III). Dean and Pack[5] regard the palpation of a mass as the most frequent and important sign. About one-half the cases reviewed showed intermittent fever at some time, while only 30 per cent complained of pain. Wollstein[7] states that in her series, pain was either absent or not severe. Irritability and restlessness might well be signs of pain in the younger children. Intermittent hematuria occurred in only about 20 per cent of the cases here reported. This is in direct contrast to the high percentage showing hematuria in malignant kidney tumors (hypernephromas) of the adult. Vomiting, frequent urination, ascites, and constipation occurred in a few of the cases. The general signs of malignancy (anemia, emaciation, general weakness, etc.) undoubtedly occurred in all cases in the terminal stages.

Diagnosis. The diagnosis of Wilms tumor depends upon the history, physical signs (especially palpable mass), cystoscopic examination, and the pyelogram. The cystoscopic examination, with catheterization of the ureters, will usually show a failure of urine secretion on the affected side.[10] The pyelogram will almost always show some deviation from the normal. Kretschmer[11] reported recently that all cases in a series of seven showed some change in the pyelogram. The most frequent observation in this series was the failure of the pelvis of the affected kidney to visualize, while the opposite pyelogram was normal. Other cases show filling defects compatible with renal tumor.

TABLE I.
Summary of Available Data Regarding Age and Sex Incidence and Location of Tumor.

Authors	No. of Cases	Age Incidence (Per Cent)				Sex Incidence (Pct.)		Kidney Involved (Per Cent)		
		Under 5 Yr.	5 to 10 Yrs.	10 to 15 Yrs.	Over 15 Yrs.	Male	Female	Right Alone	Left Alone	Both
Kretschmer	17	70.6	29.4			82.3	17.6	29.4	58.8	11.7
Hinman & Kutzman	341 1000 306	76.3	17.0	2.9	3.8	50.0	50.0	 44.4	 50.9	 4.5
Platou*	16	81.3	6.2	12.5		50.0	50.0	31.3	62.5	6.2
Balfour	8	62.5	37.5			50.0	50.0	50.0	37.5	12.5
Dean & Pack	16		93.7% under 15 yrs. Average: 3 yrs.		6.3	50.0	50.0			
Priestley & Broders	65		97% under 15 yrs.		3.0					
Prather & Crabtree	111		Average age 2.7 yrs.			46.1	53.9			
Wollstein	17		100% under 6 yrs. 88.2% under 3 yrs.			41.2	58.8	52.9	47.1	

*Babies' Hospital, N. Y. C. Personal communication to the author from Dr. Ralph Platou.

The conditions one must think of in the differential diagnosis of Wilms tumor include, mainly, those which present a mass in the abdomen and those with urinary symptoms. Hydronephrosis, pyonephrosis, and polycystic kidney will give symptoms referable to the urinary tract. A palpable mass in the abdomen might be due to retroperitoneal lymph node enlargement, splenomegaly, ovarian cyst, pointing appendiceal abscess, or to tumors of the adrenal gland, liver, or pancreas. However, the history, physical signs, and pyelogram will usually rule out these conditions in the case of a kidney tumor.

Metastases. Embryonal adenosarcomas of the kidney metastasize early in the disease, but because they also infiltrate so readily, it is difficult to separate metastases from far-reaching infiltrations. Through the renal vein the tumor has been known to extend as far as the heart by continuous growth. The lungs are the most common site of true metastasis, while the liver and opposite kidney are also affected in many cases. The regional lymph nodes are not frequently involved, because the tumor metastasizes by the blood stream. Of the eight cases seen at the University Hospital, six had known metastases. Five of these were in the lungs and were demonstrated by X-ray. The sixth patient developed a large pedunculated tumor of the bladder, which subsequently proved to be a metastasis from the kidney tumor.

Prognosis and treatment. Hinman and Kutzman[8] in 1924 reviewed 330 cases as to operative mortality and found that 94 patients died, giving a primary mortality of 28.5 per cent. The ultimate mortality (within one and one-half years) in those of this series followed was 80 to 90 per cent. The treatment in these cases had been surgery alone or surgery and deep X-ray therapy combined. All those patients who had received surgery and radiation succumbed, and the authors stated that the use of the Röntgen ray had given but very little encouragement.

Prather and Crabtree[12] in 1931 reported that of 111 cases, 18.4 per cent were dead in one month, 69.3 per cent of the remainder were dead within 15 months, while only 12.3 per cent lived two years or longer. They also stated that surgery offered the only hope for relief.

In the series of cases reported by Wollstein,[7] 16 of the 17 patients were operated upon, and in only one instance was the tumor found inoperable. Thirteen cases were traced, and it was found that 10 patients were dead within 15 months. The other three patients were alive and well after 10 months, 6¾ years, and 30 years, respectively.

Dean and Pack[5] reported the average length of life of 13 patients following nephrectomy was nine months.

Priestley and Broders[6,13] were able to trace 44 cases of their series and found four patients still living. Of these four, one had received nephrectomy alone over 13 years previously and had no evidence of recurrence. The other three received nephrectomy and radiation. One was living and well three years and three months following operation, and the other two five months following operation. The average duration of life after onset of symptoms of the 40 patients known to have died, varied with the treatment. Thus those in the advanced stage who received no treatment lived, on an average, 3.2 months. Irradiation alone increased this average to 9.2 months, while nephrectomy alone increased it to 10.2 months. In those cases which received the combination of nephrectomy and radiation, the average duration of life following onset of symptoms was further increased to 18.7 months. These authors advise radiation to decrease the size of the tumor, followed by operation and intensive postoperative radiation.

McNeill and Chilko[14] reported a survey of 383 cases in which the mortality rate was well over 90 per cent. They also reported a case of clinically diagnosed Wilms tumor in a boy 14 months of age who received 10,319 R's of deep X-ray over a period of three years with no ill effects. He was alive and well with no evidence of recurrence when the case was reported, 34 months following diagnosis.

All eight cases seen at the University Hospital have been followed. Seven of the eight patients are dead. One is alive and well seven months following onset of symptoms. This patient received nephrectomy with pre-

TABLE II.
Initial Symptom (Per Cent).

Authors	No. of Cases	Tumor Mass	Pain	Hematuria	Asthenia and Malaise
Hinman & Kutzman	228	59 6	18 4	3 0	4 3
Dean & Pack	16	50 0	25 0	6 2	12 5
Balfour	8	37 5	12 5	25 0	25.0
Priestley & Broders	65	40 5	28 9	17 4	
Prather & Crabtree	111	80 1	5 4	14 5	
Wollstein	17	94 1			

TABLE III.
Important General Symptoms (Per Cent).

Authors	No. of Cases	Tumor Mass	Intermit'nt Fever	Pain	Intermit'nt Hematuria
Kretschmer	17	100 0	52 9	35 3	5 9
Hinman & Kutzman	228	90 0		20 0	14 0
Platou	16	75 0	56 2	37 5	18 7
Balfour	8	100 0	37 5	25 0	25 0
Dean & Pack	16		62 5	35 3	31 2
Priestley & Broders	65	98 6	52 2	56 5	43 4
Wollstein	17	100 0			17.7

and postoperative radiation. Of the other seven, one was in the advanced stage on admission and received no radiation or surgery of the kidney tumor. She lived only two months following onset of symptoms. Four cases received deep X-ray therapy alone. Three of these lived an average of 11.1 months after onset, while the fourth lived 33 months after the enlarging abdomen was first noted. The tumor in this patient was comparatively benign, however, as she lived 10 months after metastases to the lungs were first observed. The two cases which received a combination of surgery and radiation lived an average of 9.2 months following onset of symptoms.

Thus, cures of Wilms tumors have been reported by the use of surgery alone, irradiation alone, or a combination of the two procedures. The best therapy at the present time would seem to be surgery and irradiation of those cases where the tumor has not spread beyond the kidney. If the tumor has spread, deep X-ray offers a good palliative procedure and will probably prolong the life of the patient.

SUMMARY

A review of several series of cases of embryonal adenosarcomas of the kidney is presented.

Eight cases seen at the University Hospital are added.

There is no appreciable difference in the sex distribution or in the kidney affected.

The initial symptom most commonly seen is a palpable mass.

The tumor is almost always palpable at some time during the disease, but hematuria is seen in only about 30 per cent of cases.

The diagnosis is based upon the history, physical signs, cystoscopic examination, and the pyelogram.

Metastases are most commonly seen in the lungs. The tumor metastasizes early.

The best treatment at the present time would seem to be nephrectomy with pre- and postoperative deep X-ray therapy. The prognosis is grave.

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Enteric Intussusception

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INTUSSUSCEPTION is that condition of unknown etiology in which a portion of the bowel invaginates itself into an adjacent part. In a small number of cases tumors or polyps are found at the site of the lesion and show a definite relation to its cause. Such a case is reported by Maisto.[1] When no tumor or polyp is present, no unanimity of opinion exists as to the cause of the intussusception.

The condition occurs most frequently in the ileocecal region and it is here that lymphoid tissue is most abundant in infancy. This thickened lymphoid tissue may simulate a tumor and mechanically give rise to an invagination. Some workers think that there is a temporary paralysis of a segment of the bowel and that peristalsis, above this site, starts the intussusception. Others think that the young child has not coördinated the intestinal tract well and that a minor disturbance may start off the process.

According to Montgomery,[2] about 80 per cent of the cases occur in the first two years of life. It occurs in boys more frequently than in girls in the ratio of three to one, and usually in healthy infants.

McGlannan[3] classifies intussusception into three groups: (1) enteric, (2) enterocolic and (3) colic, the respective incidence being about 80 per cent enterocolic, 10 per cent enteric and 10 per cent colic.

Usually there is only a single invagination. Occasionally, however, there may be a double or even a triple process. Very rarely the invagination may be retrograde. As the infolding process progresses, the mesentery is pulled in and the venous blood supply is compromised. Swelling occurs and increases. Blood extravasates into the bowel lumen, later the arterial blood supply is cut off and gangrene occurs. Peritonitis develops and, if the process has been slow, occasionally it is walled off and an abscess may form or the invaginated portion of gut may slough off and pass from the rectum, an auto-anastomosis taking place. However, by far the most frequent occurrence is a spreading peritonitis and death unless surgical relief is obtained.

The condition usually develops in a healthy, well-developed boy. The first symptom is sudden severe pain in the abdomen. The child doubles up and screams, seeking a comfortable position. He may turn over on his abdomen and assume the knee-elbow position. The cramp will subside only to return in a few minutes and, as the process progresses, pain becomes more severe until peristalsis is weaker. The child becomes pale, there is an anxious facial expression. Later he goes into collapse and notices nothing between pains. Vomiting occurs once or twice in most cases. The bowels move normally early in the attack, later vomiting is more persistent and no fecal material is passed but blood and mucus are usually expelled from the rectum or may be found on the examining finger. In the enteric type, blood is not found early and is a late sign. In the late stage, the temperature rises, and the abdomen becomes distended due to peritonitis.

Intussusception is the most frequent cause of intestinal obstruction in infants. A child, especially a boy who is well developed and healthy, who suddenly develops abdominal, cramp-like pain and vomiting, makes one suspicious of intussusception. If a sausage-shaped mass is also felt in the abdomen and bloody mucus is found on rectal examination, the diagnosis is almost certain. A flat X-ray plate of the abdomen may give additional information. The small intestine shows the picture of intestinal obstruction, i. e., gaseous distention of loops of small intestine with a lesser amount in the colon. A barium enema usually gives valuable information. This must be used at a very low pressure. The column of barium as it comes in contact with the intussusception shows a concavity, that is, it fits over the mass as a cup. At times the mass is reduced by pressure of the barium enema.

Very rarely an intussusception will unfold itself or the gangrenous portion may slough and be passed from the bowel, an auto-anastomosis taking place (1 or 2 per cent of cases, according to Montgomery[4]). Naturally, the earlier the diagnosis is made and a reduction accomplished, the better the prognosis. Kleinschmidt,[5] quoting Koch and Oerum, states that in a series of 288 infants, 52 per cent died. If the mass cannot be reduced and has to be resected, the mortality is terrific; Montgomery[6] states, over 90 per cent.

The treatment is non-surgical and surgical. Before modern surgery, attempts were made to reduce the intussusception by abdominal massage, rectal irrigations, etc. Massage now is considered to be dangerous. Rectal irrigations with water or saline solution is condemned in this country, England and Europe, but Hipsley,[7] in Sydney, Australia, reports remarkable results from the injection method. If the lesion is less than one day old and is of the ileocolic or colic variety, a barium enema may be given at low pressure and an attempt made to reduce the mass. This is successful many times. However, if there is any doubt as to reduction, the abdomen should be opened and this point determined. It is practically impossible to reduce the true enteric variety by the injection method as fluid does not pass the ileocecal valve readily.

Surgical treatment should be instituted as soon as possible in the enteric type and in the other types if the barium enema is unsuccessful, as the longer surgery is postponed the worse the condition becomes. The child should be given a general anesthetic and a right rectus

incision made. The less manipulation the better, as these children do not stand shock well. The lesion is found and reduced by pushing the infolded intestine out. Very little, if any, traction should be made on the proximal intestine. In the early cases the reduction is usually easily accomplished. However, the later ones may be very difficult or impossible to reduce. Warm saline packs should be placed about the damaged intestine and, if its color and circulation return, it should be put back into the abdomen and the wound securely closed. If reduction is impossible or the intestine is dead, we believe that it should be exteriorized as in the Mikulicz procedure. This procedure is a last resort because of the high mortality associated with it.

The following case is one of the enteric type and because of its rarity we report it.

CASE REPORT

The patient, a boy 4½ years old, was seen on November 15, 1938, because of paroxysmal pain in the abdomen. He had awakened in the morning apparently normal. While eating breakfast, he was seized with severe cramp-like pain in the abdomen. His mother stated he had a bowel movement that morning and passed a small amount of normal stool. Three days previous to onset of his illness, the boy had been given one-half an Ex-Lax tablet because of constipation. This had no effect and was repeated the next day.

The patient was put to bed where he would lie still for a few minutes and then suddenly double up and start to scream because of the abdominal pain. These paroxysms of pain occurred at intervals of two to three minutes. Between the pains the patient would relax and complain only of soreness in the abdomen. The attacks of pain increased in frequency and severity until the boy was screaming with pain about every minute. He was given aspirin by his father who also applied hot packs to the abdomen but which did not give relief. At that time the boy was given a soapsuds enema which was returned clear, and he was also given a dose of milk of magnesia which he promptly vomited. Following the vomiting he seemed relieved for about ten minutes when the attacks of pain again started as severe as before. His temperature at this time was 97.6°.

Physical examination when the boy was first seen, was negative. His temperature remained at 97.6°, and he had vomited only once following the dose of milk of magnesia.

The past history was essentially negative except for chickenpox at two years of age and a history of mild constipation.

The boy was immediately sent to the hospital, where a flat X-ray plate of the abdomen was taken and a barium enema given. The X-ray report was essentially negative; barium passed through the entire colon and there was no sign of obstruction in the large bowel. The patient had no further nausea or vomiting and a soapsuds enema was given with return of a fairly large amount of formed stool in which there was no blood. The temperature remained normal, white count normal, and urine negative. In spite of the administration of opiates, the patient's condition did not improve. At 5:00 o'clock in the afternoon the child was given chloral hydrate gr. X by rectum. He was quite relaxed following this and abdominal examination then showed a sausage-shaped mass lying transversely across the lower abdomen. This mass could also be felt on rectal examination. Dr. Chester Stewart was called in at this time and made a diagnosis of intussusception of the small intestine.

The child was taken to the operating room and a general anesthetic administered (drop ether). A right rectus incision about 3½ inches in length, with its mid point opposite the umbilicus, was made. A considerable amount of fluid was present in the abdomen. A dark-colored sausage-shaped mass was easily found. This was composed entirely of small intestine, located apparently about the mid portion of the ileum. The exact site was not located because of the character of the lesion and gravity of the situation. There was considerable edema of the involved intestine and its color was extremely dark. Gentle pressure was applied to the lower part of the intussusception, the first part of the invagination reduced easily, then the reduction became more and more difficult and towarde the last it seemed impossible to force the remaining portion out. A longitudinal tear appeared in the serous coat of the intestine about 1½ inches in length. From this tear serous fluid exuded. By applying warm saline compresses, waiting for a short time, and pushing from below again, the reduction was finally accomplished. The entire involved area was wrapped in warm saline gauze packs and rested for about six or seven minutes. On inspection at the end of this time, there appeared several small reddish areas and pulsations could be made out in the involved segment. No polyp or tumor could be felt.

The intestine was returned to the abdominal cavity and a layer-by-layer closure made of the abdominal wall with plain catgut No. 1 single in the peritoneal layer, chromic catgut No. 1 single in the fascia, and dermal used to close the skin. Three tension dermal sutures were placed through the skin and anterior rectus sheath.

The child was returned to his room and was given 1000 cc. of 5 per cent glucose in normal saline solution intravenously. Morphine gr. 1/24 was given for restlessness and pain. The immediate postoperative condition was good. However, two days later the child developed a pneumonia of the upper right lobe. Sulphanilamide therapy was instituted and two days later the patient's condition was much improved, the temperature ranging from 99 to 100° by rectum. The pulse came down from 140 to 100, respiratory rate from 40 to 24, and an uneventful convalescence followed.

The child was discharged from the hospital on the twelfth postoperative day. Since then he has been in good health and is apparently normal.

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NOTE: Subsequent X-ray examination shows no evidence of polyp or tumor in intestinal tract.

Leukemia in Childhood

An Evaluation of the Present Status of the Problem with Particular Reference to a Study of Cases Treated at the University of Minnesota Hospitals from 1930 to 1938

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THE relative frequency and the inevitably fatal termination of leukemia in childhood makes this disease one of the major problems facing the general practitioner and the pediatrist who usually assume responsibility for the care of children. For this reason it seems desirable to summarize briefly the progress which has been made toward an understanding of the pathogenesis of the disease and the methods of therapy. This paper represents such an attempt.

HISTORY

In 1845 Bennett proposed the term "leucocythemia" and Virchow the term "Leukämie" to designate the disease now regarded as leukemia. Two types were later differentiated and called splenomyelogenous leukemia and lymphatic leukemia. Ehrlich, who introduced the differential staining of leukocytes in 1891, distinguished two types of cells: granular leukocytes of bone marrow origin occurring in splenomyelogenous leukemia, and nongranular cells of lymphatic origin noted in lymphatic leukemia. Naegeli was the first to recognize and describe myeloblastic leukemia. In the early part of this century it was found that leukemia affected the entire body, and that extramedullary metaplasia of myeloid tissue occurs in both physiologic and pathologic conditions. Reschad and Schilling-Torgau described a third common type—monocytic leukemia—in 1913. Fleischmann in 1915 reported the second case but believes that in its terminal stage it changed to a myeloblastic leukemia. Dameshek and others hold to the theory that this third type of leukemia does exist as a definite clinical entity.

DEFINITION

Leukemia is a systemic disease in which the normal mechanism for the production of formed blood elements is permanently impaired, with the appearance in the peripheral blood of abnormal white cells. The two most prominent features are a marked qualitative change in the leukocytes of the blood, and varying degrees of glandular and splenic enlargement. Leukocytosis may be so high that the blood appears to be a grayish red mixture of pus and blood, separating on standing into a lower layer of red cells and an upper buffy layer of white cells. In some cases, or in different stages of the disease, there may be a normal white count or a leukopenia (aleukemic phase). The blood picture is characterized by an abnormal number of immature white cells which have entered the blood stream from the bone marrow, lymph glands or other hematopoietic tissue before the cells have completely developed. The red cells and the platelets are likewise altered, usually showing a great diminution in number with consequent anemia and thrombocytopenic hemorrhages. In all leukemias there is a marked dysfunction of the hematopoietic system, particularly of the bone marrow. This dysfunction is revealed by the changes in the circulating blood and by the infiltration of various tissues with immature cells.

Great confusion exists in the terminology and classification of diseases of the blood-forming organs. Recently there has been a tendency to use the terms leukosis, myelosis, and lymph adenosis for leukemia, myelogenous leukemia and lymphogenous leukemia, respectively. The term leukemia, like the term anemia, has a strong foothold in medical literature, although literally both are incorrect. Hodgkin's disease, lymphosarcoma and lymphatic leukemia belong to the lymphoma or lymphoblastoma group of diseases. Krumbhaar prefers the name lymphatoid diseases instead of Mallory's term lymphoblastoma for various hematopoietic disturbances.

Leukemia is usually classified on the basis of whether it is acute or chronic, leukemic or aleukemic. Subleukemic is perhaps a better term than aleukemic to designate a leukemia without an increase in the leukocyte count although in each instance there may be any degree of qualitative alteration in the white blood cells. The term aleukemic should be reserved for the condition having leukemic organ changes without a leukemic blood picture. Autopsy in the human subject or experimental animal reveals no anatomic basis for dividing the disease into acute or chronic varieties or into subleukemia or leukemia. In many cases a subleukemic blood picture will eventually become a frank leukemic type. In classifying the predominating type-class, the anatomic name of the strain of cells which play the leading rôle in the leukemic process is generally combined with the clinical terms—as acute lymphocytic leukemia, chronic monocytic leukemia, etc.

In order to indicate the origin of the cells involved, some workers designate the type as myelogenous or lymphogenous. Others who favor the neoplastic theory use the nomenclature for neoplastic diseases—such as leukemic lymphoblastoma or myeloblastoma. The origin of the monocyte is still disputed; hence monocytic leukemia cannot be designated in terms of the origin of the type cell. There are many theories as to its origin; from myeloblasts in the bone marrow, from lymphoid cells, from primitive mesenchyme cells, from fibroblasts,

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TABLE I. CLASSIFICATION OF LEUKEMIA
(Leucemia, Leukosis, Leucocythemia)

Clinical Designation	General Type of Leukemia	Cell of Origin	Specific Type of Leukemia	Synonyms Depending on Common Usage, on Course of Disease, or on Clinical or Hematologic Characteristics
Leukemia or Subleukemic (Aleukemic) Leukemia (Acute or Chronic)	Myelogenous (arising from cells of bone marrow)	Myeloblast	NEUTROPHILIC Leukemia	Myelogenous, myeloid, myelocytic or myeloblastic leukemia; myelosis
			Eosinophilocytic Leukemia	Eosinophilic leukemia
			Basophilocytic Leukemia	Basophilic leukemia
			Chloroleukemia	Chloroma or chloroleukosarcoma
		Myeloblast and megaloblast	Erythroleukemia	Leukemia associated with erythremia
		Megakaryoblast	Megakaryocytic Leukemia	
	Lymphogenous (arising from cells of lymphoid tissue)	Lymphoblast	LYMPHOCYTIC Leukemia	Lymphogenous, lymphoid, lymphatic or lymphoblastic leukemia; lymphoblastoma leukaemicum; lymphadenosis
			Leukosarcoma	Lymphosarcoma associated with leukemia
	Lymphogenous or myelogenous	Primitive mesenchyme cell	Stem cell Leukemia	Hemohistioblastic, embryonal or lymphoidocytic leukemia
		Plasma cell, myeloblast and lymphoblast	Plasma cell Leukemia	Plasmacytoma with leukemia or multiple myeloma with leukemia
	Disputed	Monoblast	MONOCYTIC Leukemia	Histiocytic leukemia; reticulosis; reticulo endotheliosis, reticulum cell leukemia; reticulosarcoma

*The common types are given in capital letters

or from macrophages. Downey believing in the reticulo-endothelial origin of the monocyte has used the term reticulo-endotheliosis as a synonym for monocytic leukemia. Sabin, Dameshek and others support the theory of the existence of monocytes as an independent strain of cells, quite apart from the histiocyte and having a separate cycle of maturation. In recent years leukemic blood leukocytes have been studied by tissue culture in an attempt to determine the origin of the various cell types involved in the leukemias. Nothing definite has as yet been found.

Many combinations of these various terms are in use, but one is seldom consistent in using the same system of terminology for different types of the disease. Forkner suggests a simplified classification including all types of leukemia, dividing them first as to acute and chronic forms, then as to leukemic and subleukemic varieties. Further separation is made depending on the type of cell involved in the leukemic process.

ETIOLOGY

The cause of leukemia is still unknown. Three different concepts as to its nature have been advocated, the neoplastic and infectious having more weight than the theory of heredity.

I. *Theory of Neoplasm.* Some observers claim that the leukemias belong in the group of neoplastic diseases, with close relationship to lymphosarcoma, leukosarcoma and Hodgkin's disease. In 1902 Babes advanced the theory of the neoplastic nature of leukemia, which was later subscribed to by Ewing and others. Three cases of lymphosarcoma have been reported by Evans and Leucutia, which changed into lymphatic leukemia (leukosarcoma) as soon as the bone marrow became involved by foci of lymphosarcoma. There are many features in leukemia which suggest a relationship to cancer inasmuch as a type of body cell appears to lose its ability to mature. In this respect it is somewhat suggestive of the process which affects the red blood cells in pernicious anemia. Some of the neoplastic characters of the white blood cells in leukemia are:

1. Uncontrolled growth.
2. Tendency to form secondary foci of growth (metastasis).
3. Progress to a fatal termination with cachexia.
4. Neoplastic type of metabolic rate of the cells.
5. Maturation with roentgen ray irradiation.
6. Failure to transmit the disease by inoculation of human beings with the blood of affected patients.
7. Birth of perfectly normal children by leukemic mother.
8. Failure to isolate an infectious agent from leukemic blood or tissues.

The neoplastic theory gains strong experimental support from the laboratory work of MacDowell and Richter and of Furth on the transmissible leukemia of mice. They conclude that leukemia is transmissible in mice only when living leukemic cells are injected into a

susceptible host, and that the nature of the resultant growth is that of a tumor with or without a leukemic blood picture.

Furth, Ferris and Reznikoff claim that leukemia in man is essentially the same disease as that in mice, and that both acute and chronic forms, myeloid as well as lymphoid, are neoplastic. Experimental evidence shows that the leukemic blood cells of mice are malignant, with characteristics of their own, and that leukemia-like carcinoma can be produced by various chemical (benzene, indole) and physical (X-ray) agents. They believe that lymphosarcoma and lymphoid leukemia are related diseases. In experimental lymphoid leukemia in mice, the malignant blood cells may localize as huge tumors (lymphosarcomas), or may diffusely invade the blood-forming tissues but not the blood stream (aleukemic leukemia), or may invade the blood stream as a classic leukemia.

II. *Theory of Infection.* The theory of the infectious origin of leukemia is advocated by clinicians who have noted a similarity in the clinical and pathologic picture to that of an infectious process. This hypothesis is applicable particularly to acute leukemia with its prostration, intoxication, purpura and septic type of fever. The occurrence of leukemia in series suggests a mild, epidemic character. Pierce has reported 41 cases of leukemia in children, in which there was a high incidence of antecedent infection (49 per cent). Ellermann and Furth have shown that experimental leukemia in fowls is due to an infectious agent, by transmitting the disease by inoculations with cell-free filtrates of blood and organs of leukemic chicks. In no other animal has the disease been reproduced without the introduction of living leukemic cells into the host. This conflict in experimental evidence makes one doubt whether leukemia in mice is the same condition as that in fowls. Many workers still believe that the acute and the chronic leukemias are different in character, the acute forms having much in common with infections and the chronic having more similarity to tumors of lymphoid or myeloid tissues. A number of investigators have produced leukemoid blood pictures by inoculating animals with streptococcus and staphylococcus obtained from the spleen and lymph nodes of leukemic patients, but they are not true leukemias.

III. *Theory of Heredity.* The concept that a constitutional inferiority of the hematopoietic organs predisposes to an unstable response to infections is supported by a number of observers. This is suggested by the occurrence of leukemia in families having other types of diseases of the blood-forming tissues, such as anemia, agranulocytosis, infectious mononucleosis, etc. Perhaps there is some factor which regulates the maturation of the granular cells just as the liver fraction seems to control erythropoiesis. One may postulate a deficiency in this regulatory factor due to a hereditary tendency to abnormal toxic reaction in infections, and as a result, a flooding of the peripheral blood with quantities of immature blood cells.

Hereditary factors in experimental animal leukemias are well known. As regards man, the genetics of leukemia have not been extensively studied. Ardashnikov investigated thirty-three family histories and found but three familial cases. Only seventeen authentic instances of familial leukemia are known. The majority of these are of the lymphatic type. There has been no recorded case of the disease in both husband and wife. As a rule, parent and child, or brothers and sisters are affected, three cases in one family being the maximum. Curschmann cites a case of leukemia in a man whose father had died of the same disease nearly fifty years before. These facts are against the theory of common environmental influences including infection, and they favor the hypothesis that heredity is an influential factor in the etiology of leukemia.

PATHOLOGY

Leukemia is considered a systemic disease, beginning as a local process and spreading throughout the body until at autopsy there is wide dissemination. The usual structural changes are those of hyperplasia of the bone marrow and lymph nodes associated with variable degrees of infiltration in the viscera, bones, meninges and skin. The pathologic findings in leukemia are confined chiefly to the blood and the blood-forming organs. They are much the same in the various clinical forms and differ from one another only in degree and in the type of predominating cell found. The marrow, spleen, and lymphatic tissue show the greatest and most constant changes. The normal bright yellow "fat marrow" in the shafts of the long bones is replaced by a grayish pink, firm, homogeneous, markedly cellular tissue. Small islands of active erythropoiesis may be left. Granular myelocytes and polymorphonuclear leukocytes predominate in the myelocytic form, while in the monocytic and lymphocytic types, the nongranular mononuclear cells are most numerous. The lymph nodes and lymphatic tissue vary greatly in involvement, since often most of them are but slightly enlarged. All involved tissues show complete obliteration of their normal architecture, the tissue being replaced by fibrosis and a diffuse mass of immature cells, either granular or mononuclear, which are large with pale staining nuclei and many mitotic figures.

It is said that any organ or tissue except teeth and nails may be infiltrated. In acute leukemia hemorrhages are common in the skin, in mucous and serous membranes and in the ocular fundi. The spleen is always enlarged, sometimes to enormous proportions. Its normal shape is preserved; its consistency is firm and the edges are sharp. The pulp and vessels are crowded with abnormal cells of the predominating type. The malpighian bodies are obliterated by myeloid cells in the myelocytic type, while the pulp is packed with lymphoid cells in lymphocytic leukemia. Cellular infiltration is seen frequently in the liver, kidneys, pancreas, and adrenals, and to a less degree in the skin, nervous system or smooth muscle. Bone lesions include subperiosteal infiltration, generalized or localized osteoporosis, irregular cortical absorption and softening without compression of the spine, and fractures in the long bones, which must be differentiated from hyperparathyroidism, erythroblastic anemia, and metastases from neuroblastoma. The skull, spine, pelvic bone and upper ends of the femora and

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humeri are most frequently involved. Falconer and Leonard in a series of cases in the lymphomatoid group of diseases report the incidence of pulmonary involvement as follows: Hodgkin's disease, 31 per cent, lymphosarcoma, 36 per cent, and lymphatic leukemia, 30 per cent.

INCIDENCE

Leukemia occurs in many animals, particularly in fowls, and to a less extent in horses, cattle, dogs, pigs, rats, and mice. In man the incidence has been variously estimated as occurring in from one to three cases among every 1000 hospital admissions. Race, country, occupation and season play no important rôle. Leukemia occurs with varying frequency at any time during life. Acute leukemia is chiefly a disease of childhood and early adult life, commencing usually before 25 years of age. Chronic myelogenous leukemia is more frequent in the fourth and fifth decades, and chronic lymphatic leukemia in the sixth and seventh decades. It has been found that about 70 per cent of all cases are under 30 years of age, and 55 per cent under 20 years. Males are more subject to leukemia than females—in the proportion of two to one. The course of the disease is identical in the two sexes. The disproportion in sex incidence does not apply to children up to 5 or 6 years.

Lereboullet and Baize in a review of 113 cases of acute leukemia in children less than 16 years of age report a high incidence in infancy, 25 in the first year and 64 during the first four years, but this decreased strikingly after the age of 4. They had several congenital cases in this group. In Cooke's series of 50 children with acute leukemia, the age distribution in boys is about the same up to 15 years but the girls show a decrease after the age of 6 years. In his group of 142 cases of leukemia of all ages, the average age of acute leukemia patients is less than 20 years; for those with chronic myelogenous leukemia, 40; and for those with chronic lymphatic leukemia, 57 years. Chronic myelogenous leukemia was more frequent than any other single type during adult life; in childhood he had only three cases.

SYMPTOMS

I. *Acute Leukemia*—with or without leukocytosis. The first clinical manifestation of acute leukemia is ease of fatigue. Increasing pallor soon develops, and it may be several weeks before a physician is consulted for these complaints or for some other more alarming symptoms. At times the patient becomes ill with dramatic suddenness as occurs in an infection, with high fever, chills, vomiting, joint pains, apathy and lemon yellow pallor, followed soon by ulcerative stomatitis, multiple hemorrhages and splenomegaly. There is individual variation but in most cases there is an insidious onset with loss of weight, progressive anemia, weakness, waxy pallor, skin hemorrhages, fever and enlarged spleen. These cardinal signs of leukemia lead one to suspect the diagnosis, but this must be confirmed by the hematology or sternal puncture. The symptoms are protean and, as a whole, fall into four groups:

1. Those associated with an increase in the basal metabolic rate (nervousness, profuse perspiration, loss of weight).
2. Those associated with infiltrated organs and glands (pressure symptoms, arthralgia, stomatitis, cyanosis, cough, hemoptysis, hematemesis, constipation, diarrhea, melena, frequency of urination, etc.)
3. Those associated with anemia, thrombocytopenia, and myocardial insufficiency (hemorrhages, dyspnea, palpitation, edema, fatigue, hemic cardiac murmurs).
4. Those associated with abnormal metabolism following the gradual progress of the disease (cachexia).

Hemorrhages are the rule. The most common sites are the mucous membranes of the mouth and nose. Severe epistaxis may be the initial symptom. Purpuric cutaneous lesions occur in multiple petechiae or ecchymoses, usually on the trunk or extremities. There are often hemorrhages in the gastro-intestinal or urinary tract, in the vagina or into the joints. Tonsillectomy may cause fatal bleeding. Retinal hemorrhages are considered by some clinicians to be pathognomonic of leukemia. Swelling and ulceration of the gums, cheek, and tonsils in many cases progress to form necrotic, gangrenous lesions. Mediastinal enlargement of the thymic area may cause early symptoms such as dyspnea from pressure on the trachea.

Hyperplasia of the hematopoietic organs is almost always present, being noted particularly in the lymph nodes and spleen. The cervical nodes are generally enlarged, and sometimes are the first to attract attention. The enlargement is usually slight, the nodes being small, firm, palpable, and discrete. The anterior cervical group is more frequently involved and may show visible tumors. In a few cases the submandibular glands may attain huge size causing marked cervical deformity. In the child splenomegaly is more constant than in the adult. The spleen is firm, smooth and somewhat tender to palpation, in the majority of cases not reaching the umbilicus, but occasionally filling more than half of the abdomen. The liver is generally hypertrophied, but to a less extent than the spleen. Leukemic infiltration of the stomach has been described (Rigler). Rheumatoid pain may play a prominent rôle and may be the initial chief complaint. Continued fever occurs, frequently becoming high and septic in type toward the end of the disease. At times abdominal pain simulates appendicitis; leukemic infiltration and perforation of the appendix have been noted at autopsy.

Schwab and Weiss report 334 cases of acute leukemia, 20.5 per cent of which had extra-ocular neurologic signs. Nervous manifestations may assume the form of facial paralysis, Jacksonian epilepsy, convulsions, exophthalmos, meningeal irritation, and deafness. Cerebral hemorrhage is a most serious complication leading to death in a few hours. Other symptoms occur, such as profound anorexia, nausea and vomiting, vertigo, dyspnea, infiltrating skin nodules (leukemia cutis) and sanguineous pericardial effusion. Due to infiltration of the kidneys with embryonal cells, albuminuria and hematuria occasionally

occur. Common to all leukemias is an excess of uric acid and purine bases in the urine, each tending to parallel the destruction of the leukocytes.

II. *Chronic Myelogenous Leukemia.* Chronic myelogenous leukemia is relatively rare in children, usually occurring in later childhood, but presents essentially the same picture as in the adult. Ease of fatigue, progressive loss of weight and strength, and an increase in the size of the abdomen due to the characteristic enormous enlargement of the spleen are early manifestations. The spleen is generally not tender but causes pain in a certain number of cases. The liver is moderately enlarged. In contrast to lymphatic leukemia, there is little gross hypertrophy of the lymph nodes. Following an insidious onset, the course is gradual and there is usually little discomfort for several weeks or months. Pains in the extremities are not uncommon. In the later stages, there are hemorrhages from the mucous membranes rather than into the skin as noted in acute leukemia, particularly from nose, gums and rectum. Hemorrhage or leukemic infiltration may cause Ménierè's syndrome, if in the labyrinth; dimness of vision, if in the retina or optic nerve; or exophthalmos, if in the orbit. A marked rise in the basal metabolism is found, up to 40 to 50 per cent above the normal. Febrile attacks occur but the elevation of temperature is not as high as in acute leukemia. Among the later symptoms are anemia, dyspnea, abdominal distress, edema, ascites, and occasional priapism. Skin lesions are relatively rare in myelogenous leukemia.

III. *Chronic Lymphatic Leukemia.* Chronic lymphatic leukemia does not occur in childhood. It is much less common than the myelogenous variety. The general symptoms closely resemble those of myelogenous leukemia and only examination of the blood can differentiate them. The most conspicuous feature is enlargement of the lymph nodes, cervical, axillary, inguinal, and mediastinal; these are firm, discrete, non-inflammatory, and painless. The spleen and liver are not as large as in myelogenous leukemia. Hypertrophied tonsils may be an early symptom associated with weakness and anorexia. Leukemides and specific cutaneous lesions (leukemia cutis) are frequent. In the terminal stage one sees cardio-respiratory and digestive symptoms with profound anemia.

IV. *Monocytic Leukemia.* Since Dameshek reviewed the literature and reported ten cases of monocytic leukemia in 1930, others have increased the list. Recently Klumpp and Evans added eight, and in 1937 Osgood described six new cases, making also an analysis of 127 previously reported. These workers believe monocytic leukemia is a relatively common condition. Rosenthal found only 2 per cent in 455 cases, while Doan, using his more sensitive supravital staining technique, estimates it at 15 per cent in his series of 75 cases of leukemia. The general opinion prevails that the incidence of each type of leukemia at all ages combined is approximately that of the particular cell types in the normal differential count from a blood smear: an average of 66 per cent myelogenous leukemia, 25 per cent lymphatic, and 5 per cent monocytic.

Monocytic leukemia is an acute type with a short clinical course ranging from one month to two years. It differs little clinically from the other acute leukemias except in age limits. The ages of those reported have ranged from 1 to 78 years, with the majority around 40 years. It is characterized by an abrupt onset of oral symptoms in 60 per cent of the cases, marked tendency to swelling of the gums, and the frequent association of stomatitis, fever, and hemorrhages from the mucous membranes. The liver and spleen are usually enlarged, but the lymph nodes are less involved than in lymphatic leukemia. Progressive pallor and weakness parallel the degree of anemia and thrombocytopenia with its hemorrhagic diathesis. Less frequent symptoms include pain in bones and joints, cutaneous papules and nodules, and monocytic infiltrative tumors. Haining reports a case of monocytic leukemia with intestinal obstruction due to infiltration. Secondary staphylococcus infection of the skin with furunculosis and carbuncles is not uncommon. The course of this disease is progressively downward. Osgood suggests that the term monocytic leukemia be used in preference to reticulosis or reticulo-endotheliosis.

V. *Other Types.* Chloroma or chloroleukemia, at first thought to be a distinct disease, is now considered a modified form of leukemia. It is a disease with localized tumor masses of greenish color, always associated with myelogenous leukemia. All the characteristic findings of leukemia are present: symptoms, blood picture, and infiltration of organs; and, in addition, the local tumor-like infiltration. These multiple tumors have a predilection for periosteum and dura, the skull bones—especially the orbits, being most frequently involved. Pressure symptoms from the mechanical effect of the tumors are in evidence. The green pigment in the tumors is apparently a lipochrome and contains iron. Kandel has reviewed 175 cases found in the literature and reported three more.

Congenital leukemia is a rare occurrence. Only 30 known cases of leukemia complicated by pregnancy have been found. Recent cases during pregnancy are described by Mehta and by Erf and Fine. Abt cites six cases in the newborn period, one of which was in a stillborn infant in the seventh month of gestation. Leukemia, however, is not transmitted from mother to child. Leukemic mothers give birth to normal children. In no authentic case has leukemia been found in the offspring of leukemic mothers. Leukemia in the neonatal period must be differentiated from erythroblastosis neonatorum and congenital syphilis.

Plasma cell leukemia is reported occasionally, associated often with multiple myeloma. Plasma cells resemble other leukocytes in potentialities for leukocytosis, infiltration, tumor formation, and leukemic infiltration. Stem cell leukemia is a term applied when very immature cells predominate. Lymphosarcoma associated with leukemia is known as leukosarcoma. Erythroleukemia is a rare type of leukemia accompanied by polycythemia. Many observers believe that leukemia and polycythemia rubra vera are closely related, the latter sometimes changing into a leukemia.

BLOOD PICTURE

I. *Acute Leukemia.* The morphologic characteristics of the blood picture of acute leukemia are:

1. Abnormal nongranular mononuclear cells, 80 to 95 per cent of leukocytes regardless of total count (leukocytosis or leukopenia).
2. Agranulocytosis, granular cells only 1 to 15 per cent of white cell count: myelocytes, immature neutrophilic polymorphonuclear cells (juvenile and staff type) and segmented cells.
3. Anemia with frequent red counts of 1,000,000 and a hemoglobin content of 20 per cent. Anemia usually secondary in type, but may resemble pernicious anemia, especially when there is leukopenia. Occasionally normoblasts, megaloblasts and reticulocytes during rare temporary remission.
4. Thrombocytopenia, below 150,000, and often below 100,000; with prolonged bleeding time, normal clotting time and poor retraction of clot.

The number of circulating leukocytes is greatly variable during the course of the disease and in different patients, ranging from 250 to 1,000,000 per c.mm., the average being from 20,000 to 200,000. In a few days' time the count may drop from 100,000 to 6,000, or suddenly rise to that extent in another case. There may be normal white cell counts, or the so-called subleukemic leukemia (with leukopenia) may have counts less than 5,000 for long periods. These leukemias constitute a diagnostic problem, but the stained blood smear sooner or later will usually show the typical abnormal nongranular cells. These stem cells or undifferentiated cells are large, round or oval elements, having a large, irregular, eccentric nucleus with a narrow border of hyaline protoplasm. Stained by the Giemsa method, the nucleus is pale violet with a fine chromatic structure and contains vacuoles and a deeper stained nucleolus, while the cytoplasm is deep azure. There has been considerable controversy concerning these abnormal agranulocytes—whether they originate in the lymphatic tissue and are lymphoid in origin or whether they come from the bone marrow and are therefore myeloid. The peroxidase reaction is not successful in identifying myeloid cells by the presence of granules since the true myeloblasts, like the lymphocytic series, are peroxidase negative. These nongranular leukemic cells show an increase in protease, as do the myelocyte and polymorphonuclear leukocyte, while lymphoid cells do not possess this proteolytic activity. This fact leads one to believe that these stem cells are myelogenous in origin.

II. *Chronic Myelogenous Leukemia.*

1. Leukocytosis of 40,000 to 500,000, usually over 200,000.
2. Predominant cell: mature polymorphonuclear leukocyte—with 10 to 30 per cent myelocytes, and 10 to 25 per cent juvenile and staff cells. 95 to 99 per cent of white blood cells are of myeloid origin. Eosinophilia occasionally 50 to 80 per cent ("eosinophilic leukemia").
3. Anemia moderate at first (red blood count: 2,500,000 to 3,000,000); more marked in later stages, and improved during spontaneous or therapeutic remissions.
4. Platelets usually increased.
5. Peroxidase test positive only for myelocytes up through mature polymorphonuclears.
6. Indophenol blue synthesis test positive (Kracke).
7. Increase in protease.

There is no other disease in which so many different types of cells are seen in the blood smear.

III. *Chronic Lymphatic Leukemia.*

1. Leukocytosis of 40,000 to 500,000, usually over 100,000.
2. Extreme lymphocytosis with 90 to 99 per cent small lymphocytes. Smudge forms constant.
3. Anemia less marked than in other types. Red blood count may be normal in early stage.
4. Thrombocytopenia marked.
5. Peroxidase test negative.
6. Indophenol blue synthesis test negative.
7. No protease.

IV. *Monocytic Leukemia.*

1. Leukocytosis usually up to 320,000, but white blood count may go as low as 600.
2. Predominant cell: monocyte and promonocyte (50 to 75 per cent).
3. Red blood count markedly decreased in terminal stages.
4. Thrombocytopenia toward the end.

There seems to be an inverse relationship between the degree of monocytosis and the duration of the illness. In the fulminating cases, the number of monocytes in the peripheral blood is great, or else rapidly increases to high levels, while in the slowly progressing cases, the absolute number of monocytes is only moderately elevated.

DIAGNOSIS

It is difficult to separate the acute or chronic leukoses on a clinical basis. Although usually associated with splenomegaly or lymphadenopathy from which the diagnosis is suspected, leukemia cannot be differentiated until a hematologic examination is made. The diagnosis of leukemia can usually be made from the blood count and, what is more significant, from the blood smear. Until recently leukemia was regarded as a disorder characterized by a persistent increase in the number of white blood cells. According to the present conception of the disease and the recognition of subleukemic states, an increase in the number of white cells is not an essential diagnostic factor. The most reliable criterion for the diagnosis of any leukemia is a preponderance of immature cells regardless of the total number. The difficulty in diagnosis is due to the many variations that may occur both in the clinical picture and in the laboratory observations.

Without a careful blood examination, leukemia may readily be mistaken for other conditions because of the initial symptoms in mouth and throat, fever and hemorrhagic tendency. These lead one to think of diphtheria, ulcerative stomatitis, scurvy, purpura hemorrhagica, and endocarditis. When leukocytosis is present, as

in the majority of cases, leukemia may come first to mind. Leukopenia, however, may mark the entire course of the disease, or be present in certain phases. Abt has listed two groups of differentiation in leukemia in childhood.

Group I. *Differentiation when Leukocytosis Is Present.*

A. *Nonleukemic conditions simulating leukemia.*
   1. Pertussis.
   2. Pneumonia.
   3. Sepsis.
   4. Von Jaksch's pseudoleukemic anemia.
   5. Cooley's Mediterranean erythroblastic anemia.
   6. Infectious mononucleosis.
   7. Mediastinal tumor (thymoma or lymphosarcoma).
   8. Niemann-Pick's essential lipoid histiocytosis.

B. Leukemia simulating other conditions, such as:
   1. Mediastinal tumor.
   2. Rheumatism.
   3. Diarrhea.
   4. Parotitis (Mikulicz's disease).

Group II. *Differentiation when Leukopenia Is Present.*

A. Nonleukemic Conditions Simulating Leukemia.
   1. Sepsis with leukopenia.
   2. Agranulocytosis.
   3. Gaucher's disease.
   4. Aplastic anemia.
   5. Malaria.
   6. Nonlipoid splenohepatomegaly; Letterer-Siwe's disease.

B. Aleukemic leukemia simulating other conditions, such as:
   1. Sepsis.
   2. Appendicitis.
   3. Aplastic anemia.

After careful weighing of the clinical findings and of the blood picture, diagnosis may still be uncertain. Roentgenograms may be of material assistance where there are bone lesions. Prominent signs of some leukemias may be pain in the long bones as in osteomyelitis; pain around joints resembling acute rheumatic fever; periosteal reactions as in scurvy or luetic periostitis; spontaneous fractures in local osteolytic processes; bulky tumors of single bones; chloroma; or osteolytic lesions, as in multiple myeloma. One case of unusual interest was reported by Clark, in which the roentgenogram revealed a marked disturbance of the calcium content of the bones of the entire skeleton, particularly in the pelvis and femora. The blood calcium was found to be 19.3 mg./100 cc. and persisted at high levels until the end. This was attributed to leukemic infiltration of the parathyroid gland. Biopsy of an enlarged lymph node may assist in the differentiation but it is often impossible to tell from a histologic preparation of a lymph node alone whether one is dealing with a leukemia, lymphosarcoma, leukosarcoma, or Hodgkin's disease. The architecture is destroyed by an invasion of small lymphocytes so that biopsy gives no clear picture of any certain disease.

Of major importance in the diagnosis of leukemia is the sternal puncture. Simultaneous studies of the bone marrow and the circulating blood in living subjects is a relatively recently developed diagnostic procedure. The peripheral blood often fails to furnish accurate information concerning underlying abnormalities in the blood-forming organs. Changes at the sources of blood cells are probably visible earlier than in the blood, and distinguishing characteristics of different pathologic states may be seen in the bone marrow. Kingery has published a report of 15 ambiguous cases in which sternal puncture has furnished information of noteworthy diagnostic accuracy, which blood examination or biopsy of a node was unable to give. They describe their technique with a spinal needle. It is simple, applicable to ambulatory patients, and free from unpleasant symptoms or sequelae. The positive value of sternal puncture is in the various types of leukemia, while its negative value is in Hodgkin's disease and lymphosarcoma. It must be emphasized that sternal biopsy will not always settle the diagnosis. At one level the bone marrow may appear normal, although at another level it may be hyperplastic.

Dameshek's sternal method is the trephining technique. While the hematopoietic pattern can be better identified, the technique is more complicated, and there is the possibility of postoperative hemorrhage.

The criteria for diagnosis of leukemia from a sternal puncture are as follows:

1. Lymphatic leukemia—
   lymphocytes 20%
   or large lymphocytes ..... 5 to 20%
2. Myelogenous leukemia—
   premyelocytes 20%
   or myeloblasts 4%

   Suggestive of myelogenous leukemia—
   premyelocytes ..... 10 to 20%
   or myeloblasts ..... 2 to 4%

   Nucleated cells in normal bone marrow ..... 70,000/c.mm.

Splenic puncture is seldom used as a diagnostic tool. Weil believes that it should be done more frequently, the chief contra-indication being a hemorrhagic tendency. It is done with a needle under local anesthesia; splenic pulp is aspirated and spread on slides for staining. The splenogram gives much the same picture that the marrow puncture does. It may be a guide to prognosis and treatment, more than 20 per cent of primitive cells indicating a grave outlook and therapy not indicated. Splenic puncture is not without risk, there being a 1 per cent mortality from postoperative hemorrhage.

Leukemia should be differentiated from the various conditions associated with localized or generalized lymphadenopathy. Lymphocytic leukemia is in many ways similar to Hodgkin's disease and lymphosarcoma, but the blood picture generally is sufficient to differentiate it. Hodgkin's disease, more prevalent in the second and third decades, produces progressive painless enlargement of a group of nodes, which remain firm, discrete and free from suppuration and adhesions. Lymphosarcoma, occurring in the age limits from 25 to 55 years, may involve any lymphoid tissue. Accessible involved nodes

show unilateral or unequal disturbances, almost bony hardness, early fusion between nodes, and adhesions to adjacent tissues. The nodes are not tender and do not suppurate, but they cause serious pressure symptoms. Tuberculous cervical adenopathy is characterized by inflammatory reaction with tenderness, edema, suppuration, fusion of nodes, adhesions to the skin and underlying tissues and X-ray evidence of calcium deposits. Mikulicz's disease is a disease with chronic, symmetrical, painless enlargement of the lacrimal and salivary glands, which is not leukemic.

A number of diseases have been mentioned with leukemoid blood pictures but without tissue changes. Others that may be included are smallpox, chronic infection such as tuberculosis, hemolytic icterus, polycythemia vera during anemic phase, pernicious anemia, Banti's disease, active regeneration following anemia or severe hemorrhage, certain chemical poisoning as arsenic, mustard-gas or mercury, and malignant tumors of the lymphoid system. With regard to the latter, it may be said that in true leukemia, there is a disturbance of all the elements of the blood, while in blood dyscrasias based on tumors of the lymphoid system, tumor cells are present but the rest of the cellular elements are not affected.

Acute leukemia may be confused with acute benign lymphadenosis or infectious mononucleosis. Both are diseases of childhood or young adults. Both are characterized clinically by a sudden onset, high fever, generalized adenopathy and acute pharyngitis and tonsillitis. The blood count reveals an absolute lymphocytosis. In 1923 Downey and McKinlay reported nine cases of benign lymphadenosis with criteria for differentiating it from leukemia and for separating the various types of the atypical lymphocytes found in the blood. They are described as highly differentiated, mature, "leukocytoid" lymphocytes. Paul and Bunnell in 1932 found that the heterophile antibody reaction is positive in infectious mononucleosis and negative in other lymphadenopathies. Weinstein and Fitz-Hugh confirmed this in 16 cases of leukemia in which the heterophile antibody titer was uniformly at a low level.

Therapy

Marked improvement in the clinical condition of the leukemic patient with decrease in organ enlargement and reversal of the blood status toward the normal may occur in three ways. It may come about spontaneously without apparent cause; it may result from intercurrent acute infection; or it may follow therapeutic effort, particularly X-ray irradiation.

Clinicians have noted for a long time that intercurrent infections during the course of leukemia are associated with a decrease in the number of leukocytes. In the last decade artificial production of fever by malarial inoculations has been studied with variable reports as to the effective response. In most of the cases the fall in the white blood cells was quite transitory.

The medical literature abounds in suggestions regarding effective medicinal measures. Leukocytolysis, or reduction in the number of white blood cells, may be accomplished by several methods: chemical, biologic, or physical. Numerous remedies have been tried for leukemia before irradiation. Since the etiology is still obscure, no specific remedy is known, and the treatment is essentially symptomatic. The chief purpose is to produce *(1)* improvement of general condition by rest, diet, and sedatives; *(2)* increase of strength and efficiency by blood transfusions and roentgenotherapy.

Among the many therapeutic substances that have been advocated are lead, arsenic, antimony, sulphur, iodine, benzol, quinine, malarial inoculations, liver extract, ventriculin, embryonic extract (fetal liver), tuberculin, and nuclein. Many of these are toxic and their use entails considerable risk; few of them afford much palliation.

1. *Chemical Therapy.* Before the advent of the roentgen rays the method of treatment in most common use was with arsenic in the form of Fowler's solution. After the general introduction of irradiation, arsenic fell into relative disuse, but recently attention has once more been called to its value in chronic myelogenous leukemia by Forkner. It has practically no influence in chronic lymphatic leukemia. In 1936 Stephens and Lawrence reported seven cases of chronic myelogenous leukemia treated with prolonged courses of potassium arsenite. To be effective, the drug should be given in rapidly increasing doses until toxic symptoms appear, then continued in amounts as large as can be tolerated, a regime which can be maintained for over a year without serious reactions. They conclude that arsenic is an effective palliative especially when accompanying or alternating with radiotherapy. Kandel and LeRoy also find that arsenic therapy and X-ray treatment are not antagonistic, and that a remission of the leukocytosis may be induced with arsenic as soon as the postirradiation decline of the leukocyte count ceases. The toxic reactions of inorganic arsenic are either transient, mild symptoms (conjunctivitis, coryza, nausea, diarrhea) or the more serious complications (polyneuritis, cirrhosis of the liver with ascites, cutaneous pigmentation and painful plantar and palmar hyperkeratoses). Organic arsenicals (arsphenamine) are more dangerous and have produced little improvement in the leukocyte count.

Benzol has had a somewhat similar history as arsenic, but has not regained its early favor. Von Korányi (1912) introduced this drug in the treatment of leukemia. It is ingested in large doses in capsules. Improvement of the general condition is dependent upon reduction in the excessive number of leukocytes. Its administration must be discontinued if the red cells decrease to below 2,000,000. Benzol is contra-indicated in albuminuria, in anemia, in toxic effects on the liver and kidneys, and in hemorrhages due to thrombopenia. Its effects are less easily controlled than those of arsenic, and aplasia of the red bone marrow is a theoretic, if not an actual danger. Antimony and other drugs have produced similar remissions, but their employment has been disappointing and far inferior to irradiation for that purpose.

2. *Biologic Therapy.* Leukocytolytic substances have been demonstrated in leukemia. An antileukocytic serum produced from leukemic white blood cells has been used

in cases of leukemia but the beneficial response is only transitory.

3. *Physical Therapy.* Radiotherapy, although not curative, is undoubtedly of the greatest therapeutic value in chronic myelogenous and chronic lymphatic leukemia. Irradiation is slightly more efficacious in relief of symptoms in the myelogenous variety. It is generally conceded that radiation therapy is without symptomatic effect in the acute cases, the disease progressing rapidly toward the fatal end. Because roentgen irradiation, even in small doses, has been followed by an increase in toxicity and rapid death, its use is usually contra-indicated in acute leukemia. Rosenthal and Harris, however, disagree with this verdict. Since the roentgen ray was first tried in leukemia by Senn in 1903, its use has enjoyed increasing and justifiable popularity.

Radium, in the form of surface application or packs, was first used when deep X-ray therapy was not available, or in patients unable to be moved from their homes. Although large quantities of radium are required and its application presents difficulties, in recent years it has become more widely used. Leucutia reports good results with radium packs in leukemia. Fricke (1928) showed definite and impressive palliation with radium therapy in 157 patients. More recently Fricke and Watkins presented 16 cases of unusual borderline types of leukemia, many with leukopenia. They believe that radium is the most satisfactory therapeutic agent in these obscure cases with low leukocyte counts. Roentgenotherapy covers a larger portal and the effect of the treatment is usually too sudden and drastic.

Roentgenotherapy is now accepted by the majority of clinicians as the therapeutic method of choice in the treatment of chronic forms of leukemia for producing temporary remissions which may persist for some months or even years. No definite plan of treatment can be outlined in advance; the patient must be considered as an individual, and the therapy repeated according to his response. The marked radiosensitivity of leukemic tissue, particularly in children, and the lability of the blood count necessitate extreme caution. Since leukemia is incurable and palliative radiation must be continued for long periods, marked reactions should be avoided and the radiation must be the smallest amount that will produce beneficial results. Small fractional treatments are tolerated better than larger ones. The doses and intervals between radiation must be determined by the patient's condition and a careful check of the blood count. It is unnecessary, even harmful, to attempt to reduce the leukocytes to normal or below normal. Symptomatic relief and general improvement may be accomplished with the white cell count around 10,000 to 30,000. There is always the hazard of a secondary aplastic anemia. Too vigorous therapy may precipitate the same condition observed in the terminal stage of the disease when anemia and thrombopenia become the dominant features. A sudden drop in the leukocyte count may be followed by a clinical aggravation or even by cachexia.

Further treatment is guided by the activity of the leukemia, controlled by periodic blood examinations and a strict surveillance of the patient's general condition. Anemia is no contra-indication to roentgenotherapy. As soon as there is a change in the blood count, quantitative or qualitative, an increase in the mediastinal shadow, a recurrence in the enlargement of spleen or lymph nodes, a rise in the basal metabolic rate or deterioration in the physical state, irradiation is repeated. A number of remissions may be produced in this manner, but gradually the therapy becomes less effective, and as the disease progresses, it shows complete resistance to therapy.

There is virtual chaos concerning the technique of irradiation. The areas to be irradiated are a subject of controversy. Leucutia in a review of 2725 cases and personal observation of 129 has concluded that, in view of the fact that palliation is all that can be produced and that some effect may be expected from every radiation, the technique is not of such paramount importance. There have been good results claimed from medium penetrating rays with larger doses, from harder rays with smaller fractionated doses, and from radium packs, whether irradiation is made over spleen, lymphatic system in lymphatic leukemia, long bones in myelogenous leukemia, great vessels of the chest, bones of the thorax, kidneys, entire trunk, or even over the entire body in the form of teleroentgenotherapy. David believes that the therapeutic agent should directly attack the centers of cells proliferation and advocates first treating the bone marrow (vertebrae, ribs, scapulae, sternum and long tubular bones), later applying roentgen rays to the spleen and peripheral glands.

Craver prefers the Heublein method of prolonged low intensity irradiation of the whole body—over a period of two to thirty days in a ward where the entire bodies of four patients can be irradiated simultaneously with the tube at some distance. Treatment is given for sixteen to twenty hours daily. Enlarged spleens in myelogenous leukemia should be irradiated locally preliminary to teleroentgenotherapy. Langer, who emphasizes the importance of the vegetative nervous system in the production of leukemia and related diseases, recommends roentgen treatment over the vegetative nervous system with small fields instead of using teleroentgenotherapy.

The leukemic patient should receive supportive treatment of various kinds. His feeling of well-being depends to a large extent upon the state of the red cells and hemoglobin. Results of X-ray therapy are greatly improved when massive doses of iron are administered throughout the course of the illness. In marked anemia and tendency to hemorrhage multiple transfusions are indicated for temporary amelioration, but they have no effect on the circulating leukocytes or in altering the course of the disease. Liver extracts, ventriculin and various extracts of spleen have been used with but minimal response. Nucleotide, which has a favorable effect in stimulating the production of granular leukocytes in certain types of agranulocytosis, has been of no value in the treatment of subleukemic leukemia.

Israëls in 1935 studied the effect of Lugol's solution in chronic lymphatic leukemia. Although in some cases the iodine cause a reduction in the white cell count, the failure of symptomatic relief, the lack of improvement

in the anemia when present, and the uninterrupted course of the condition suggest that the leukemic process itself was unaffected. Isaacs believes that Lugol's solution has a definite effect, especially in chronic lymphatic leukemia, in relieving some of the symptoms associated with a high basal metabolic rate.

Operative procedures are contra-indicated because of the low resistance to infection and the bleeding tendency. A rapid exodus is apt to follow dental extraction for removal of foci of infection. Tonsillectomy and splenectomy are of no value, and even hasten the fatal termination, especially in acute leukemia.

Prognosis

Acute leukemia is invariably fatal in a few weeks or months, all treatment being of no avail in affecting the rapid course of the disease. Although the ultimate prognosis in chronic leukemia is bad, and no instance has been reported of recovery in a case in which the diagnosis of leukemia was unquestioned, treatment such as arsenic or radiation therapy may produce temporary remissions for many months or years. Forkner (1937) has reviewed the subject of spontaneous remissions and reported cures of leukemia. One remarkable feature of leukemia is the great variation in the length of its course. It may be fulminating or greatly prolonged and relatively benign. Occasionally myelogenous leukemia lasts for ten years or more, but a long course is more common in lymphatic leukemia. Treatment cannot extend the clinical course of chronic leukemia beyond a certain limited period, but it vastly improves the quality of life remaining to the patient and promotes his activity and happiness. The improvement in the general condition after a course of X-rays is usually dramatic. The disease, however, always proceeds by exacerbations and remissions to a fatal termination. The immediate prognosis may be estimated with some accuracy by observing the effects of treatment of the hemoglobin and erythrocytes. A steady rise gives a good immediate prognosis, while a fall indicates the probability of an early fatal issue.

Nathanson and Welch (1937) in a report on life expectancy and incidence of malignant disease estimate that 50 per cent of the patients with acute leukemia are dead in two months, 75 per cent in six months, and the remainder within a year. The average survival in chronic lymphatic leukemia is 3.45 years. In 96 cases of acute and chronic lymphatic leukemia, only 18 per cent were living five years after onset. In 141 cases of acute and chronic myelogenous leukemia, 22 per cent were living after a five-year period. Isaacs also has found that the average duration of life in chronic leukemia is about 3½ years. Leucutia claims that radiation therapy increases the expectation of life very little, perhaps adding about one-quarter to one-third of the usual duration without treatment. It is said, however, that the patient's working efficiency is increased at least 60 per cent throughout the entire course of the disease as a result of radiation therapy.

Analysis of Leukemia Patients Admitted to the Pediatric Service in the University of Minnesota Hospitals, January 1, 1930, to May 23, 1938

The following analysis includes all available case records of leukemia in children up to the age of 16 years, admitted to the Pediatric Service in the Minnesota University Hospitals from January 1, 1930, to May 23, 1938. In some instances comparison is made with similar studies of other observers.

Classification

The cases reviewed in this series fall into the following classification. Diagnosis was established in 58 per cent of the cases by autopsy findings. The remaining cases were diagnosed by clinical signs and blood examination.

TABLE II.

	No. of Cases	Per Cent of Total No.
Acute Lymphatic Leukemia (Lymphocytic)	31	77.5
Myelogenous (Neutrophilic)	5	12.5
a Acute—2 cases		
b Chronic—3 cases		
Reticulo-endotheliosis (Monocytic)	2	5.0
a Reticulosarcoma—1 case		
b. Leukemic Reticulo-endotheliosis—1 case		
Atypical	2	5.0
Total	40	100.0

Etiology

a. *Yearly Incidence.*

TABLE III.

Year	No. of Cases
1930	2
1931	2
1932	1
1933	5
1934	3
1935	7
1936	9
1937	8
Jan 1 to May 23, 1938	3
Total	40

b. *Age and Sex Incidence.*

TABLE IV.

Age (Years)	No. Males	No. Females	Total
0 to 1	2	1	3
1 to 2	1	—	1
2 to 3	3	1	4
3 to 4	3	2	5
4 to 5	2	1	3
5 to 6	3	2	5
6 to 7	2	—	2
7 to 8	1	1	2
8 to 9	2	1	3
9 to 10	—	—	—
10 to 11	2	—	2
11 to 12	1	2	3
12 to 13	—	1	1
13 to 14	2	1	3
14 to 15	1	—	1
15 to 16	2	—	2
Totals	27	13	40

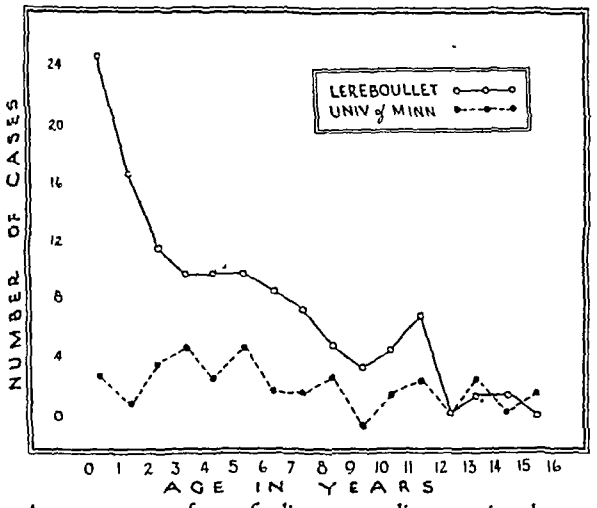
Diagnosis

TABLE V.

	Age
Youngest case—Atypical Leukemia	2 months
Oldest case—Leukemic Reticulo-endotheliosis	15½ years
Average age for entire group	6.56 years
Percentage of cases under 6 years	52.5%

27 cases occurred in males and 13 in females (ratio approximately 2:1).

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A comparison of our findings regarding age incidence of the entire group is made with that of P. Lereboullet and P. Baize.

c. *Predisposing Factors* (questionable).

1. *Family History.* The family history was reported in 38 of the 40 cases. With one exception there was no blood dyscrasia in the family.
2. *Previous Infectious Diseases.* Eleven cases (27 per cent) of the group had a history of an infectious process shortly preceding the onset of the first manifestation.

TABLE VI.

Type of Infection	No of Cases
Pneumonia	3
Pertussis	3
Otitis Media	3
Pyuria	1
Upper Respiratory Infection	1

SYMPTOMATOLOGY

a. *Initial Manifestations.*

Comparison is made with the results of a corresponding study of 50 cases of acute leukemia reported by J. V. Cooke (see Table VII).

In addition to these initial manifestations many of the patients developed some of the following symptoms before hospitalization: fever, epistaxis, general glandular enlargement and buccal bleeding.

Ramsay (1927) considers the chief symptoms of leukemia to be fever, large abdomen, skin hemorrhages, epistaxis and buccal bleeding.

b. *Duration from onset of first manifestation to hospital admission* (see Table VIII).

DIAGNOSTIC PROCEDURES

a. *Blood Findings.*

The average blood pictures at the time of hospital admission are compared with the findings of Ramsay (1927). Ramsay's cases are all under 8 years of age. (Tables X and XI).

b. *X-Ray Findings.*

Diagnostic X-ray procedures were used in 80 per cent of the group; of these, 22 per cent had negative X-ray findings. X-rays of a leukemic nature included bony rarefaction, splenomegaly, leukemic bone infiltration, lung infiltration, mediastinal nodes, hepatomegaly, enlarged kidneys, abdominal ascites and thymic enlargement. Fifty-six per cent of the cases with positive X-ray findings received autopsy confirmation, while in 36 per cent of the remainder postmortem examination was not made.

c. *Biopsy Studies.*

Biopsy studies were made on 10 cases, 12 specimens being obtained. All but one of these cases subsequently died while in the hospital. Six of the biopsies gave positive diagnostic information: two from cervical lymph nodes, three from axillary nodes and one from a skull tumor. Indeterminate results were obtained from the following biopsies: two from inguinal lymph nodes, and one each from axillary node, bone marrow, pleural fluid, and leg tumor.

COURSE OF THE DISEASE

Eleven patients were discharged from the hospital. One case of chronic myelogenous leukemia (Neutrophilic) is being followed regularly in the Outpatient Department, receiving deep X-ray therapy as indicated, and showing satisfactory progress. The remainder comprise eight cases of acute lymphatic leukemia and two cases of chronic myelogenous leukemia. One case of acute lymphatic leukemia of two months' duration has just been discharged from the hospital with a hopeless prognosis. Follow-up information has been obtained from the family or the attending physician in eight of the other discharged cases—death having occurred in each.

For the entire series the average number of days' duration from onset of the initial symptom until death was 145 days in acute leukemia and 1277 in chronic myelogenous leukemia.

Autopsy Findings.

Twenty-three cases (58 per cent of total number) were subjected to postmortem examination. Anatomical changes observed at necropsy were quite similar in all types of leukemia. The essential difference was primarily one of degree and type of predominating cell found.

More than half of the cases showed multiple hemorrhagic areas, and leukemic infiltration of liver, kidney, and spleen. Eight had bone marrow involvement and six pulmonary infiltration. There were five reports of generalized lymphoid hyperplasia. Occasional cases showed leukemic infiltration of heart, thymus, or adrenals; and one case was characterized by multiple tumors.

SUMMARY

Leukemia is a systemic disease in which the normal mechanism for the production of formed blood elements is markedly impaired. Although a definite etiology remains obscure, concepts of its neoplastic and infectious nature seem more tenable than does that relative to its hereditary origin. Characteristically, the acute form occurs chiefly in childhood and early adult life, affecting males twice as frequently as females. Pathological

TABLE VII.

Symptoms	U OF M HOSPITAL SERIES				COOKE'S SERIES	
	Lymphatic Leukemia		All Cases			
	No of Cases	Pct	No of Cases	Pct	No of Cases	Pct
Asthenia	2	6 4%	4	10 0%	17	34%
Pallor	13	41 9	13	32 5		
Rheumatoid pains	5	16 1	7	17 5	5	10
Cervical Glandular Enlargement	4	12 9	5	12 5	9	18
Large abdomen	1	3 2	3	7 5	1	2
Skin hemorrhages	1	3 2	2	5 0	7	14
Localized swelling	2	6 4	2	5 0		
Cough - dyspnea	1	3 2	2	5 0	5	10
Anorexia	1	3 2	1	2 5		
Abdominal pain	1	3 2	1	2 5	2	4
Stomatitis					2	4
Neuropathic symptoms					2	4
	31 Cases		40 Cases		50 Cases	

TABLE VIII.

Diagnosis	No of Cases	Shortest Period (Days)	Longest Period (Days)	Average Period (Days)
Acute Lymphatic (LYMPHOCYTIC)	31	4	210	63
Myelogenous (NEUTROPHILIC)				
a Acute	2	21	42	31 5
b Chronic	3	120	821	384
Reticulo endotheliosis (MONOCYTIC)	2	6	35	20 5
Atypical	2	16	60	38
Entire Series	40	4	821	81 8

TABLE IX. PHYSICAL FINDINGS ON HOSPITAL ADMISSION

Analysis of Physical Findings	DEGREE				Cases in Which Present	Pct of Occurrence
	Slight	Moderate	Marked	Extreme		
Pallor	—	14	15	3	32	80%
Splenomegaly	4	14	11	2	31	78
General gland enlargement	9	17	3	—	29	73
Hepatomegaly	—	21	6	—	27	68
Cervical gland enlargement	4	14	5	—	23	58
Enlarged tonsils	—	12	2	1	15	38
Skin petechiae	2	8	3	—	13	33
Buccal bleeding	2	5	—	—	7	18
Stomatitis	1	4	2	—	7	18
Localized swelling	1	4	1	—	6	15
Retinal hemorrhage	—	1	1	—	2	5
Scalp tumors	—	1	—	—	1	3

TABLE X.

Blood Analysis	No of Cases	Lymphatic Leukemia 31 Cases	Myelogenous Leukemia 5 Cases	Reticulo endotheliosis 2 Cases	Atypical 2 Cases	Grand Average
Hemoglobin	40	36 8%	47%	66%	83 5%	41 96%
Erythrocytes	36	1,741 212	2,320,000	2,750,000	—	1,880,000
Leucocytes	40	61,426	158,983	7,600	6 525	69,601
Polymorphonuclears	40	17 8%	39 6%	30 0%	41 8%	21 84%
Lymphocytes	38	78 7%	29 3%	71 5%	38 0%	70 49%
Monocytes	38	1 4%	1 0%	2 0%	—	1 22%
Myelocytes	38	0 3%	13 7%	—	—	2 09%
Promyelocytes	38	—	7 5%	—	—	1 0%
Metamyelocytes	38	—	5 3%	1 0%	—	0 76%
Immature or atypical cells	29	24 7%	14 5%	Present	Present	22 62%
Stem cells	38	—	3 5%	—	—	0 53%
Reticulocytes	15	2 9%	2 0%	—	—	2 93%
Platelets	30	101,768	97,533	81,500	—	99,993

TABLE XI.

Blood Analysis	Ramsay Myelogenous Leukemia 19 Cases	Ramsay Lymphatic Leukemia 70 Cases
Hemoglobin	31 8%	31%
Erythrocytes	2,114,800	1,946,000
Leucocytes	139,020	210,245
Polymorphonuclears	38 7%	
Lymphocytes	25 0%	
Myelocytes, Promyelocytes, Metamyelocytes	32 0%	

changes are found mainly in the blood and blood-forming organs, but other organs frequently show extensive leukemic infiltration.

Symptoms of four general types occur in the acute form: *(1)* those associated with disturbances in metabolism; *(2)* those which are secondary to the infiltration of various organs; *(3)* those related to anemia, thrombocytopenia, and myocardial insufficiency; and *(4)*

TABLE XII.

Mortality in Hospital and Duration from Onset.

Type of Leukemia	Deaths		Days Duration		
	No	Pct	Maximum	Minimum	Average
Lymphatic (LYMPHOCYTIC)	23		273	20	109 7
Myelogenous (NEUTROPHILIC)	2				
a Acute	2		135	48	91 5
b Chronic	—		—	—	—
Reticulo endotheliosis (MONOCYTIC)	2				
a Reticulosarcoma	1		64	—	64
b Leukemic Reticulo endotheliosis	1		—	12	12
Atypical	2		171	18	
Entire Series	29	72 5%	272	12	114 7

abnormal metabolism following gradual progress of the disease

The characteristic blood picture for each type is presented. In general, the incidence of each type of leukemia is approximately that of the particular cell types in the normal differential count of a blood smear.

Sternal puncture may be of importance as a diagnostic procedure in the absence of positive blood findings Lymphatic node biopsy has little value as a means for diagnosis in about one-half the cases.

Specific therapy is yet unknown The trend at present, however, is to (1) improve the general condition by rest, diet, and sedatives; and to (2) attempt to increase the patient's strength by blood transfusions and roentgenotherapy.

The prognosis remains hopeless. A rapid or delayed termination may result. In cases of the latter, recurrent exacerbations and remissions until death usually occur.

A detailed analysis of cases observed at the Minnesota University Hospitals from January, 1930, to May 23, 1938, is given.

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The Effect of Obstetrical Analgesics on the Infant

Clinical Observations of 188 Cases

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IN the last few years, an increasing demand for the lessening of pain in childbirth has been placed on the obstetrician. There has been considerable difference of opinion as to whether present day analgesic agents are harmful to the child W. W. Bell in March, 1937, reported a series of 441 cases in which 225 patients were given scopolamine and 216, nembutal. His report showed that in the 225 patients who had scopolamine there were three unaccountable deaths, and that no harmful effects were obtained from the use of nembutal.[1] S. F Moore and R. A. McCurdy of Western Reserve University in 1936 reported 150 cases in which paraldehyde was used in conjunction with barbiturates in which there were no maternal or neonatal deaths.[2] DeLee in *The 1937 Year Book of Obstetrics* said that more women will suffer permanent damage and more babies will, likewise, with the use of these analgesics.[3]

It was with this statement in mind that we decided to follow a series of babies in our practice for a considerable length of time to see if there were any later effects upon the infants We have used several combinations of drugs since 1935, but for the past three years we have confined ourselves to the use of a combination of nembutal, paraldehyde, and nitrous oxide gas analgesia. We first used the combination of paraldehyde and nembutal as described by Rosenfield and Davidoff.[4] The dose recommended by these men varied from 6 to 13 grains of nembutal along with 6 to 12 drams of paraldehyde This dosage varied with the individual cases. In our series the dosage was somewhat reduced We used from 4½ to 7½ grains of nembutal, from 3 to 5 drams of paraldehyde, and nitrous oxide gas We had a somewhat lower response as far as the analgesic effects were concerned, but this lower dosage almost completely eliminated the requirement of any resuscitation of the infant In this series of 188 cases, 74 per cent experienced complete amnesia, 21 per cent partial amnesia, and 5 per cent were failures Out of 188 babies, 181 cried immediately and required no resuscitation, five, or 2 3 per cent, required mild resuscitation. The only resuscitation used in these infants was gentle slapping, and 10 per cent carbon dioxide, and 90 per cent

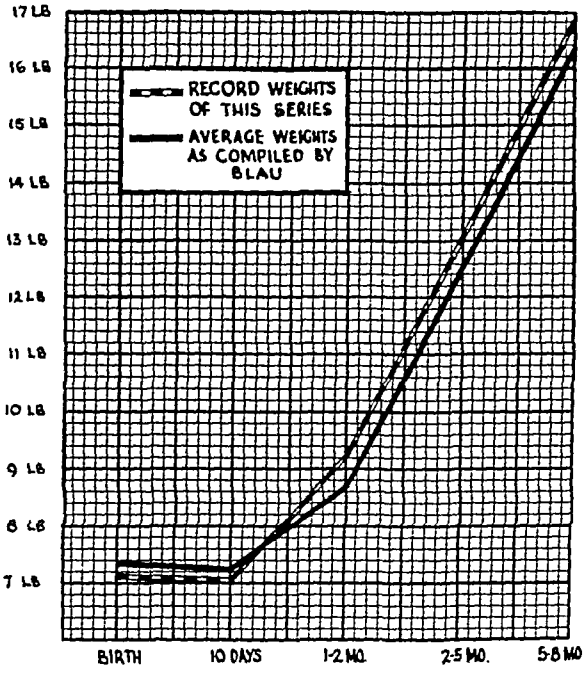
oxygen gas. In these five babies, the cord was around the neck twice, and it is a question whether the oligopnea was produced by the anoxemia due to the cord about the neck, or by the analgesia. I believe that the cord about the neck was the cause of the trouble, as we have had the same experience where no analgesic agent was used.

One case required considerable resuscitation. The mother had a particularly difficult labor which lasted 20 hours with extreme molding of the head; no instruments were used. When it was seen that the labor was going to be quite difficult, additional doses of nembutal and paraldehyde were stopped and the mother was fully conscious at the time of delivery. This child was quite apathetic the first four or five days and had several convulsive seizures. The child nursed very poorly the first week. He was put in an incubator, and oxygen was administered continuously. Subcutaneous fluids were given repeatedly. The convulsions stopped on the fifth day. This child is quite bright; he sat up of his own accord at 7 months, was able to stand at 11 months, and could talk sufficiently well at 13 months to make short sentences. The child at this writing is 15 months old and has been entirely free of convulsive seizures.

One baby in our series was stillborn. The mother was two weeks past the expected date of confinement and X-ray revealed a large head which was out of proportion to the pelvis. We had advised caesarean section, but this was refused. The mother was in labor for five hours with very hard pains. The head was extremely molded. No instruments were used.

In the 188 cases in this series, including the five that required immediate mild resuscitation, the infants nursed readily, were not apathetic or listless, cried lustily and responded as normally as did the infants in whom no analgesic agent had been given to the mothers. The weight gain curve for the ten-day stay in the hospital of our series of infants corresponded favorably with the weight gain curve of an equal number of infants in the hospital in which the mothers received no analgesic whatsoever.

In starting our study, we originally had 300 obstetrical patients and nembutal, paraldehyde, and nitrous oxide were used in the dosages previously mentioned. We had to eliminate 112 cases from our series, because of failure of the mothers to return for monthly check-ups on their infants. We also found it difficult to get the parents to bring the children in on an exact date, so we found it best to compile our chart with the following subdivisions:



Graph of Compiled Data

birth weight, weight at 10 days (the usual time of leaving the hospital in our cases), weight at 1 to 2 months, weight at 2 to 5 months, and from 5 months to 8 months.

Our plan is to follow these children over a period of several years to see if any noticeable effects develop at a later date. As can be seen from the graph, our infants' weight gain over the period of study, corresponded very favorably with the normal weight gain as compiled by the charts of Doctor Blau. In fact, our infants are slightly above the average. In compiling the time at which our group of children first recognized their mother and reached for an object, we find that they are well within the normal limits.

We find in conclusion that, as far as our study goes, there are no harmful effects, either mental or physical, that can be ascertained by clinical observation, to the infants whose mothers have had nembutal and paraldehyde and nitrous oxide gas in the doses we have mentioned.

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Pneumonia in Childhood

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THIS paper presents the results of a questionnaire sent to a number of physicians relative to the diagnosis and treatment of pneumonia in children. A survey of this character, which constitutes a heart-to-heart chat with 68 physicians as to what they are actually doing, should be of interest. The physicians who supplied the data used in this paper are practicing in the eastern section of South Dakota. A review of these letters proved to be a pleasure, indeed, and I only regret that all cannot read them.

The survey disclosed that the majority agree with the general idea that during childhood there is more bronchopneumonia than lobar pneumonia, but that a true ratio of the two conditions cannot be stated because of mistaken diagnosis, differences related to age, etc. The relative frequency with which the diagnosis of each of these two conditions was considered overlooked is indicated in the following table.

Do Many Cases Go Undiagnosed?*

	YES	NO
Bronchopneumonia	39	16
Lobar Pneumonia	31	25

*In this and following tabulations the figures indicate the number of physicians who replied to a questionnaire

There can be no doubt that a large number of cases of pneumonia are undiagnosed. According to the replies received to the questionnaire, this applied particularly to bronchopneumonia. One justification of the statement that many cases of pneumonia are not recognized lies in the number of surprises revealed by the X-ray. This method of examination often reveals consolidations which are not accompanied by definite clinical and physical signs.

The results of inquiry relative to the use of local applications to the chest in cases of pneumonia are shown in the following table.

Do You Employ?

	Oil or Grease	Mustard Plasters	Pneumonia Jackets
YES	30	33	44
NO	14	20	33

For at least twenty years these procedures have been largely discarded by children's hospitals and by many physicians, but for some reason teachers and writers are fearful of omitting to mention that light oils, poultices, and jackets may be employed to ease pain and lighten the attack. The arguments against their use are well known and I suspect that many more physicians than indicated in the poll, do employ them solely to satisfy the relatives, rather than to aid the comfort of the child.

It is not strange in the practice of medicine generally and specifically here in the treatment of pneumonia, that forms of conduct, methods, and even superstitions handed down through the ages, continue with so powerful an influence. It is certain that the present generation of parents, who think they survived the ills of their own childhood largely because of steaming fumes of animal fats, vegetable oils, body odors, and even of asafetida, are not likely to discard them easily. However, a large number of parents readily accept the new teaching and welcome the idea of fresh, light, dry, and clean bedding for their sick children. Two physicians with large country practices noted amusing contrary opinions on the question of greasing the chest. One, with marked brevity said, "Yes, because it keeps off onions"; and the other with abhorrence stated, "Absolutely no. In a country practice keep off such dirt and grease." It was a surprise to find so many physicians discarding the use of mustard plasters, which in my opinion do have some merit. Several added favorable mention of diathermy.

The following table indicates the results of inquiry relative to the use of X-ray therapy in pneumonia.

Do You Use X-ray Therapy?

YES	NO
1	38

A striking fact here is that only one physician who replied employs X-ray therapy, although a large number of them undoubtedly are equipped to do so. Several explanations for the one exception may be implied—one probably being that it represents "action" to a family suddenly concerned about a very sick child, and so in spite of added expense, the countryside is soon talking about the wonderful value of the X-ray in pneumonia. A survey of the literature does not convince one that it has any proven advantage for the pneumonia patient.

Do You Use?

	Steam Inhalations	Cold Air	Fresh Air, (warm, moist)
YES	53	19	42
NO	5		

Steam inhalation is overwhelmingly the choice of all. It is indeed a sane remedy, but physicians should not cease to caution against the danger of scalding or burning children associated with this procedure.

Do You Use Serum?

YES	NO
26	27

This survey indicates a most watchful interest in serum therapy. The direct question was probably misconstrued by many, because it is hardly possible that the facilities for typing and for early diagnosis can be available to so many as to permit the correct use of serum. One physician noted that he had used serum for 20 years without a single fatality and several spoke of the routine use of vaccines, antitoxins, antigens, phylacogens, and "edwenil". Because of the relatively low mortality of pneumonia in childhood and the favorable course it usually runs, all this sort of therapy should be withheld until definite value has been proven. The use of antipneumococcic serum, though of accepted value in pneumonia in adults has not played much of a rôle as yet in the pneumonias of childhood, probably on account of the difficulty in getting the early type determination so necessary for this specific therapy. The method of administration of sera is not easy, nor do such injections add to the rest and comfort of the patient.

An objection may be made here to teaching centers which send men to meetings who extol some new form of treatment and state that such a method is in vogue at their institution, without making it clear that its use is solely for the purpose of evaluation. To be specific, we may ask if the physician from Harvard, talking before the Texas Medical Association, stated the conservative facts as to the preventive and curative properties of M B 693, though the Associated Press featured the story over the country in no uncertain way. It is not right for us to play upon the hopes and emotions of sick people, and abuse the confidence of the public in the medical profession. Most physicians know that the use of this drug is being rigidly controlled for the definite determination of its value and use, and we may hope that such study may be continued to a successful end.

Relative to serum therapy of pneumonia in children, much experimental work remains to be done. Early typing of pneumococci is essential and it is difficult to obtain sputum from the child, although it was thought for a time that typing could be done from cultures of the nasopharynx, larynx, or stomach contents; it was found later that the organism in sputum or blood may not be of the same type. There is no specific serum available for bronchopneumonia, due to organism other than pneumococci, but it has been well established that when the type is correctly determined in the lobar pneumonia of children, and the serum given promptly, early recovery follows. When given late, no beneficial effect is noted. Again, it must be remembered that many cases of lobar pneumonia make spontaneous recovery without serum or any specific treatment. Of present interest regarding serum treatment is the statement of the New York City Health Department in their February Quarterly Bulletin, to the effect that they are doubtful of its real value. This was partly based upon the great drop in the mortality rate in New York City, because now the same distinct drop is seen from the rates over the nation.

DRUGS: Do You Use?

	YES	NO
Quinine	15	37
Sulfanilamide	29	29
Coal Tar Derivatives	20	37
Opium	44	10
Barbiturates	13	47

Quinine has had a long and varying record as to its preventive and curative powers. Most present-day workers regard its value as doubtful and place it still on the experimental list. In view of the reluctance of large pneumonia centers to drop it entirely, the above tabulation is surprising in showing so many individual men in the field who have definitely discontinued its use.

Sulfanilamide, on the other hand, is a new drug that is still in the experimental class but one that has been quite generally accepted. I doubt if it is to our credit to rush in with a drug of this kind, with its known and attendant harmful effects, and use it in these children who are ill with a more or less benign disorder.

A drug which promises much but which is still under strict study, is a new sulfanilamide derivative—M B 693 or sulfapyridine. More experimental data is necessary to confirm glowing advance announcements.

Sedatives. Of admittedly prime importance is the comfort of a pneumonia patient. There may have been some misunderstanding again as to the meaning of these questions, because it is a surprise to find so many physicians not using these drugs. Aspirin and phenacetin usually give relief, even against pleuritic pains, and when used should be accompanied by alkalis or citrates.

In the poll, opium finds great favor and codeine espe-

Supportives and Stimulants Used:

	YES	NO
Alcohol	17	40
Digitalis	29	30
Strychnine	9	47
Camphor in Oil	14	43
Caffeine Sodium Benzoate	27	30
Nitroglycerine	5	49
Atropine	18	36

cially is most efficacious. Morphine should not be used in cases of depressed respiration where breathing is an effort. Chest binders, but not adhesive, sometimes help, as do hydrotherapy and oxygen.

The survey shows that these drugs are used by a minority of the physicians who replied. Some doctors commented upon the importance of digitalis. My own experience has been that digitalis is useless except for patients who had cardiac disease previous to the onset of the pneumonia. I was surprised to note that alcohol was not in common use.

SUMMARY AND CONCLUSIONS

A questionnaire was sent to 68 physicians in eastern South Dakota inquiring as to their opinions and practices in certain pertinent phases of pneumonia in childhood. The replies are summarized and commented upon.

The predominant opinion of these physicians is definitely for rest, quiet, good nursing care and supportive measures in pneumonia in childhood. They emphasize the danger of overtreatment with many of the formerly accepted therapeutic procedures. Likewise, a warning is voiced against readily accepting newer methods of treatments until their worth is well proven. This in no way discountenances continued study of and experiment with every reasonable measure having any likelihood of lessening the severity, complications or mortality of pneumonia in childhood.

NOTE: I wish to thank most sincerely all who replied to the questionnaire.

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Hypertrophic Pyloric Stenosis

A Review of 100 Cases

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FOR many years I have been interested in hypertrophic pyloric stenosis, and after having operated 100 patients for this condition it is my privilege to present this clinical review.

Much has been written on hypertrophic pyloric stenosis, and the development of the medical and surgical aspects of the disease has been particularly intriguing. As early as 1777 Armstrong described the necropsy findings of a case. The first case reported in this country was by Beardsley in 1841. Siemon and Dawosky reported the first case in Germany in 1842 and were the first observers to call attention to the projectile type of vomiting. Landerer, in 1879, first used the term, "congenital pyloric stenosis." Hirschsprung in 1888 presented the clinical findings and created modern interest in this disease of infants.

All the babies suffering from this condition previous to 1893 were treated medically. It was in this year that Cordua performed the first operation for this pathological entity, a jejunostomy, but the patient died. Finkelstein first called attention to the palpable tumor in 1896. In 1898 Willy Meyer operated on two patients, doing a gastro-enterostomy, and both died. Stern, of Germany, did a gastro-enterostomy the same year and lost his case. By 1904 Shaw and Elting found records of 39 operated patients with only 17 recoveries; curiously enough, only five had been done in this country.

As late as 1908, Fredet and Dufour collected published results in 135 operations and showed a mortality of 50 per cent. These results led Huebner and Pfaundler in Germany and Hutchinson in London to express themselves as being against operation for this condition. In the next few years Scudder, Downes and Richter, in this country, obtained better results, but the mortality was still so high that physicians were hesitant about referring their patients for operation.

Rammstedt in 1913 reported a case, upon which he did his now familiar muscle-splitting operation, and the patient recovered. He urged that this type of operation be used to replace gastro-enterostomy, divulsion, and pyloroplasty, then in vogue. Two very important factors in favor of his operation were that (1) the stomach was not opened and (2) the operative time was considerably shortened. In 1908, Fredet devised a muscle-splitting operation, and after taking a "V" out of the pyloric muscle converted the longitudinal incision into a transverse one, but it was not until Rammstedt brought forth his operation that improvement in operative results began to be recorded.

Holt in 1920 gave the following results previous to the Rammstedt regime.

RESULTS IN 135 OPERATIONS

	Cases	Recoveries
Gastro-enterostomy	52	22
Divulsion	35	21
Pyloroplasty	22	13
Various modifications and combinations	26	12
	135	68

Mortality approximately 50%—After Holt.

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RESULTS OF MEDICAL TREATMENT AND THE OLDER AND THE MORE RECENT SURGICAL TREATMENT

	Cases No.	Recov. No.	Died No.	Mort. Pct.
First Period, 1901-1911				
Without operation	24	10	14	58
Operation (gastro-enterostomy)	17	7	10	58
Total	41	17	24	58
Second Period, 1912-1914				
Without operation	7	3	4	57
Operation:				
(Gastro-ent. 24, Rammstedt 6)	30	17	13	43
Total	37	20	17	45.9
Third Period, 1915-1916				
Without operation	2	1	1	50
Operation (Rammstedt)	61	47	14	23
Babies Hosp.—Holt	63	48	15	23.8

RAMMSTEDT'S OPERATION AT BABIES HOSPITAL

	Cases No.	Deaths No.	Mortality Pct.
Prior to 1915	6	2	33
1915	35	10	28.5
1916	26	4	15.3
Total	67	16	24

Three patients died from gastro-intestinal conditions subsequently (4 weeks, 6 weeks, 7 weeks); one died from empyema (3 months) and one from pneumonia (4 months); 46 have been followed and are well to date.—HOLT.

After 1917, Rammstedt's operation was the only one ever performed for this condition at the Babies Hospital in New York.

There has been nothing new advanced regarding the etiology of the condition since the original theories of Hirschsprung, Holt, Downes, Still and others. We appreciate that it is a congenital condition, but what relationship, if any, exists between hypertrophy and spasm still remains in doubt. The theories which have been advocated are purely of an academic nature and I can see no reason why they should produce a great deal of argument. The important thing regarding this disease is its early recognition, and the institution of proper treatment.

I feel that if anything has been learned from a review of these cases it is the belief that the most successful treatment of true hypertrophic pyloric stenosis is surgical.

The pathology in the pylorus is limited to the circular muscle fibers, which are markedly hypertrophied. The size of the tumor encountered at operation, does not bear any relation to the severity or duration of the symptoms. In the tumor of moderate size, the tissues are usually not friable and very little hemorrhage is encountered. The large tumors usually present very friable tissues, and in many instances there occurs hemorrhage which must be controlled.

The history usually reveals a healthy, well nourished, breast-fed infant who suddenly, about the third week of life, begins to vomit. The vomiting persists, usually after every feeding, and within a few days becomes projectile in character. Shortly the weight loss becomes noticeable, the infant becomes dehydrated, urine becomes scanty and bowel movements are very small or absent. The baby presents no fever, and the appetite is unimpaired. This characteristic vomiting, in most instances, starts about the third week of life. In this series, one case started at the sixth week and another at the eighth week, but this is very exceptional. During the first week of illness, gastric peristalsis becomes visible. It simulates a golf ball passing along under the skin, from left to right, and is best observed immediately after feeding.

Palpation of the pyloric tumor is a valuable diagnostic aid, and should be searched for when the stomach is empty. Some observers state that they have palpated the tumor in 100 per cent of their cases. I cannot be in accord with this observation as I was unable to palpate the tumor in over 33⅓ per cent of these cases. One must necessarily agree that palpation of the tumor is of value, but I do not consider it essential in making the diagnosis. Given the above clinical picture, the diagnosis should not be difficult. Rarely is the X-ray of any benefit, but in doubtful cases it should be used to rule out congenital anomalies of the esophagus and duodenum. It has been my experience that if barium is given before operating it clings to the mucosa of the stomach and pylorus and makes the feeding problem more difficult for a few days.

In reviewing these cases, one is struck by the fact that in every instance where we have had a true hypertrophic pylorus, medical management has been of no avail. We should not procrastinate with these infants, permitting them to go way beneath their birth weights. Their resistance is lowered to a minimum and any mild respiratory infection is apt to cause death.

It has been very interesting to observe the changes in the pre-operative preparation of these infants. Downes in 1920 was still doing an occasional emergency operation on these babies, with the result that in 175 cases, he had a mortality of 17.1 per cent. He reported that death was due to collapse. He felt that 150 cc. to 200 cc. of hypodermoclysis increased the tendency to bleed. As time passed, surgeons began to realize that the preparation of these infants for surgery should be done in conjunction with pediatrists, if the best results were to be obtained. We learned that this is never an emergency operation, and before any operative procedure is done, at least 24 to 48 hours must be spent in an attempt to restore body fluids, and blood chemistry levels. Experience has taught that feedings should be continued to within six to eight hours of operative time. Subcutaneous fluids, either normal saline or Hartmann's Solution, should be given two or three times before operating. The amount given at one time will vary from 150 to 250 cc. This is a life-saving measure for the infant and is probably the most valuable procedure in pre-operative preparation. If the condition of the patient is poor, hypodermoclysis should be given just before the operation and repeated on the return from surgery. One must be careful not to give too much parenteral fluid and waterlog the patient. The rapidity with which it is absorbed is the guide as to time and amount to be given. I have not found the postoperative hypodermoclysis

necessary very often. Intravenous glucose was never resorted to in this series and I do not feel that transfusions are necessary either pre- or postoperatively unless hemorrhage comes into the picture. In these cases, transfusions were never used.

Just before taking the baby to the operating room, wash the stomach until the fluid is returned clear. Wrap the infant in cotton-batting to prevent loss of body heat, and keep warm while operating with hot water bottles or an electric pad. Bevan, in 1920, went on record as saying that under no circumstances should general anesthesia be used in operating these infants. However, all the infants in this series were operated under ether anesthesia given by the open mask drip-method. I think this procedure is absolutely safe and the most satisfactory method when given by a competent anesthetist skilled in giving anesthesia to infants. There were no anesthetic deaths in this series.

Rammstedt's operation was performed on all these babies, and I do not believe that this operation can be improved upon for simplicity, speed and results. Rammstedt is responsible for the major reduction in the mortality rate of this disease. Perhaps the only danger in this muscle-splitting operation lies at the duodenal end of the tumor. Bear in mind that the transition from hypertrophied to normal muscle is very abrupt at the duodenum and special caution must be exercised to avoid tearing into the pyloric canal. If such an opening does occur, it must be recognized and repaired at once. Such an accident occurred four times in this series, with no untoward results.

Hemorrhage can usually be controlled with hot packs, but fine ligature must be placed around distinct bleeding points. Fine silk ligatures have a tendency to cut through the muscle too easily and I have found catgut more satisfactory. Closure of the abdominal wall should be carefully done in layers, and stay-sutures should always be used to prevent postoperative eviseration. Protect your dressing well with rubberized silk or some similar substance to prevent contamination of the wound.

Credit for much of the success we have now in the treatment of this condition must be given to the pediatricians because of their splendid postoperative technique. I question if surgeons alone could have improved much on Bolling's figures in 1925 when he reported a mortality rate of 8.5 per cent. To my mind it is the close coöperation between pediatricians and surgeons which saves so many lives. The major responsibility of postoperative care, the feeding problem, lies in the hands of the pediatrician.

On returning these babies to bed, external heat, in the form of hot water bottles must be used. Chloralhydrate may be necessary to prevent crying during the first 48 hours. Most of the infants in this series received ½ ounce of water by mouth about two hours after returning to bed. Two hours later they received ½ ounce of breast milk. This schedule is repeated every two hours for the first 24 hours. In the second 24-hour period, increase water and milk to 1-ounce feedings and continue this increase daily until the demand of the infant is met. When 4 ounces of milk is being given at a feeding, we usually drop out the water, and feed every four hours. With such a feeding schedule, we find that no vomiting takes place after the operation, convalescence is smooth, and hospital stay averages about 14 days.

There were three deaths in the series, giving a mortality of 3 per cent. All deaths occurred during September of 1933. In each instance, the infant developed an intractable diarrhea, and died. Postmortems were done on two of the babies. The one who died 10 days after the operation, showed a well-healed abdominal wound, peritoneal cavity normal in appearance. The stomach was moderately dilated, pylorus still presented hypertrophy and a well-healed scar, lumen readily admitted a lead pencil. Microscopic section through the healed scar of the pylorus showed intact mucus membrane. Over this membrane there was a thin layer of muscle; above this there was a fibrin clot which was beginning to organize; in the edges of the clot there were numerous giant cells surrounding small pieces of catgut; there were very few of any p.m.n. cells in the neighborhood of the wound. The peritoneum seemed to be creeping over the defect.

The one who died three weeks after operation showed the scar of original operation well healed. The scar on the pylorus was well healed with no evidence of infection or inflammation. The stomach was still distended, the wall being ½ to ¾ cm. in thickness. Pylorus was patent; there was no evidence of obstruction or retention.

No cause of death other than alimentary intoxication could be found in either of these cases, and I suppose that in all humility one might place the operative mortality at 1 per cent.

This series covers a period of 12 years. Some of these children are now 10 and 12 years of age, and they are all perfectly well, normally developed children; none of them have any symptoms referable to pyloric obstruction.

I sometimes wonder if we of the present generation appreciate the struggle and efforts put forth by the older men in their conquest of this disease. Are we not prone to forget about the early mortality figures and the tragedies which accompanied this condition only at the turn of the century? I know of no other operation in the entire field of surgery which has reduced its mortality from 100 per cent to less than 3 per cent in a period of 40 years.

NOTE—Seven additional patients have been operated since this paper was written, and there has been no further mortality.

Reducing Premature Infant Mortality with Special Emphasis on Resuscitation*

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DURING the past few years much interest has been shown in the infant mortality rates of the various states of the country. The rates have been falling but the number of infants dying from prematurity has changed very little; in fact, in some sections of the nation there has been an actual increase in premature baby deaths. It is therefore of special significance to make every effort to reduce the premature infant mortality rates. A better understanding of the newer methods involving management and feeding of these small infants is most essential.

At the Minneapolis General Hospital, an opportunity presented itself which permitted the gradual application of the various methods developed for the care of the premature infant. At one time the mortality rate was very high as revealed in Table I. The deaths were divided into two groups, those occurring during the first forty-eight hours of life, and those appearing after the second day of life. The first few days were referred to as the "period of resuscitation." The second period was roughly divided into two phases. The interval from the forty-eighth hour to the tenth day represented the period of "adaptation to feeding." From the eleventh day up to the time of discharge was considered the "period of growth and development."

An analysis of the causes of death in each period gave some indication as to the procedures which might give satisfactory results. The study has extended over a period of eight years. During the first and second years of observation, a large number of the babies expired from bronchopneumonia, otitis media, and erysipelas in the period of growth and development. Respiratory infections were prevalent among the personnel of the hospital especially during the winter months of the second year. Rigid isolation technique was therefore introduced and the results were most encouraging.[1] The 27 per cent death rate occurring after the tenth day of life in the second year of observation dropped to 3.5 per cent the following year. This marked reduction was considered to be due in part to the fact that less infection existed in the community during the third year. However, there was again an increase of respiratory infections in the fourth year but the death rate rose only to 6.9 per cent. With gradual improvement along simple lines in the physical set-up of the premature nursery, permitting isolation technique to be carried out with greater ease, there was a consistent fall the following years in the number of infants who were lost during the period of growth and development. This is shown in Table II.

Examination of the records of the infants dying during the period of adaptation revealed that many of these babies had a large amount of regurgitation which was followed in a few days by marked diarrhea. At autopsy, bronchopneumonia was found in a few cases while others revealed some evidence of infection in the middle ear. After a study of the feeding program, the volume of the food given these infants was considered to be too large. An attempt had been made to cut short the period of physiological weight loss and obtain a rather rapid weight gain early in the life of the infants. The result was regurgitation followed by diarrhea which so weakened the premature's condition that death easily occurred in some cases from an infection. Efforts were made to stop the regurgitation and the diarrhea by concentrating the formulae and by changing to feedings containing a high protein and a low carbohydrate content. The response was poor. The best policy appeared to be prevention of the diarrhea rather than treatment.

A new feeding schedule was adopted.[2] Definite amounts of food were prescribed for the infants. Starting with very small amounts for the smaller premature babies, the food intake was gradually and carefully increased for at least ten days. After this, larger increases in volume were permitted. No effort was made to produce a rapid gain in weight. In some instances the infants still weighed less on the tenth day than at birth. However, the majority of the babies adapted themselves to the formula and progress was ultimately good.[3] The mortality rate during the period of adaptation to feeding dropped to a low figure and remained there, a fact clearly demonstrated in Tables I and II.

Strict attention to the protection of the premature from respiratory and skin infections and proper regulation of the feeding schedule reduced the premature infant mortality rate after the second day of life, but there was no improvement during the first forty-eight hours. In fact during the third and fourth years of observation (Table I) there was an increase in the mortality rate. Many babies died shortly after birth. Too much attention had been given to the later phases of premature care, and not enough emphasis had been placed on the methods of resuscitation.

It was noted that many of the premature infants who failed to respond during the first hour of the period of resuscitation had subnormal temperatures; a few were as low as 93 F. The ordinary measures of applying external heat especially by means of a hot water bottle had been used. This observation prompted the construction of a unit or incubator containing a regular bassinet, by means of which the temperature of the infant was kept at the proper level from the moment of birth (figure 1). The unit was simple and inexpensive. It consisted of a white enameled wooden box, supported on four legs with roller casters. The cover, which could

*From the department of pediatrics of the University of Minnesota. This is the third of a series of papers on "Premature Care" appearing in the Journal-Lancet.

TABLE I.
Mortality Rate of Premature Infants
Four Year Period – Isolation Technique and Definite Feeding Program Established

Year of Observation	1 1930-1931*		2 1931-1932*		3 1932-1933*		4 1933-1934*	
Total No of Prematures	148		155		139		145	
No. of Deaths	No.	%	No.	%	No	%	No.	%
Less than 1 hr.	7	4.7	5	3.1	12	8.6	17	11.7
1 hr. to 16 hr.	18	12.1	22	14.0	19	14.0	15	10.5
16 hr. to 48 hr.	9	6.0	6	3.7	6	4.4	4	2.8
Total up to 48 hr.	34	22.8	33	20.8	37	27.0	36	25.0
48 hr. to 10 days	34	23.0	27	18.0	5	3.5	1	0.7
More than 10 days	22	15.0	42	27.0	5	3.5	10	6.9
Total over 48 hr.	56	38.0	69	45.0	10	7.0	11	7 6
Grand Total	90	60.8	102	65 8	47	34.0	47	32.6

*July 1 to July 1.

TABLE II.
Mortality Rate of Premature Infants
Four Year Period – Special Emphasis Placed on Resuscitation

Year of Observation	5 1934-1935*		6 1935-1936*		7 1936-1937*		8 1937-1938*	
Total No. of Prematures	146		120		89		96	
No. of Deaths	No.	%	No.	%	No.	%	No.	%
Less than 1 hr.	5	3.4	3	2.5	2	2.2	3	3.1
1 hr. to 16 hr.	17	11.6	14	11.7	3	3.3	5	5.2
16 hr. to 48 hr.	6	4.1	7	5.8	6	6.7	6	6.2
Total up to 48 hr.	28	19.1	24	20.0	11	12.2	14	14.5
48 hr. to 10 days	5	3.4	4	3.3	0	—	2	2.0
More than 10 days	7	4.9	4	3.3	1	1.1	2	2.0
Total over 48 hr.	12	8.3	8	6.6	1	1.1	4	4.0
Grand Total	40	27.4	32	26.6	12	13.3	18	18.5

*July 1 to July 1.

be raised, contained sliding panels permitting observation of the baby through a small opening without too much exposure. Inside the incubator a spark-proof thermostat regulated the temperature, the heat being supplied by four electric lights on the floor of the box. The unit was always kept ready in the obstetrical delivery room with the thermostat set at 100 F. This temperature kept warm the equipment in the incubator such as the bedding of the bassinet and the receiving blanket containing the sterile absorbent cotton enclosed with gauze.

Immediately after birth, the premature baby was placed in the bassinet and wrapped in the warm cotton and blanket. The infant was then closely watched and the necessary measures for resuscitation were performed within the unit rather than on the delivery table where chilling could easily take place. Great care was taken to remove mucus from the air passages by carefully wiping the nose and mouth with a piece of soft gauze. The head of the bassinet was always lowered four to six inches so that the secretions and the mucus which had accumulated in the respiratory passages could escape (figure 2). For the first hour of life, the premature infant was disturbed as little as possible. Then if he appeared to be doing fairly well, he was moved in the incubator to the nursery and weighed. Following this, a rest period of sixteen hours was permitted. No water or food was administered. At the end of this period, excessive amounts but not all of the vernix caseosa was removed with oil[4] and if the baby's color was good, water and later milk were given in small amounts. Throughout the first forty-eight hours of life the infant was closely observed for cyanotic attacks, for they could appear suddenly and without warning. This was especially true in case of infants weighing less than 1500 grams (3.3 pounds).

The results of these simple measures in handling the premature babies were fairly good. The mortality rate dropped from 19.1 and 20 per cent in the fifth and sixth years of observation to 12.2 and 14.5 per cent in the seventh and eighth years (Table II). However, with the constant change in the attending and resident physicians, there were short periods during which a tendency to drift back to the older methods of resuscitation occurred. Some of the physicians did not appear to take enough interest in the resuscitation of the newborn or the treatment of asphyxia.

It is altogether fitting, therefore, to offer in more or less outline form some of the salient features of present day resuscitation in order to stimulate a more determined and concentrated effort to improve the system of accomplishment of normal breathing in the newborn. Although there is still plenty of room for investigative studies,

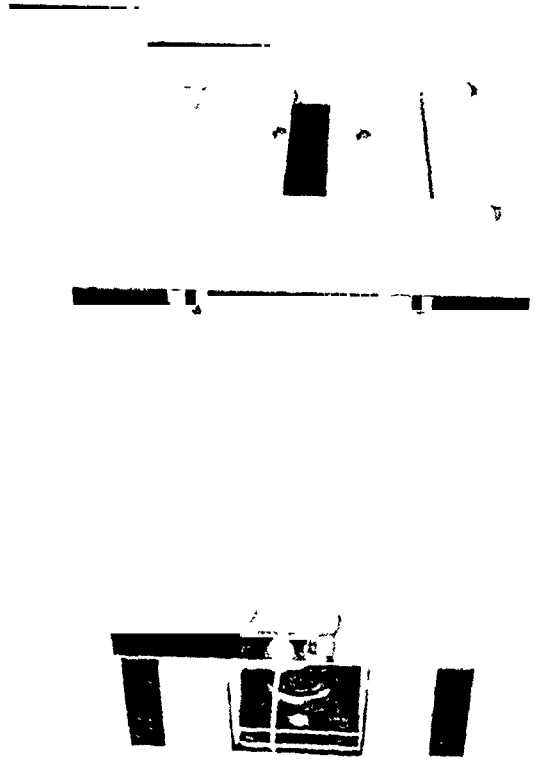


Fig. 1. Exterior view of premature unit or incubator. The sliding panels for the opening in the cover are shown.

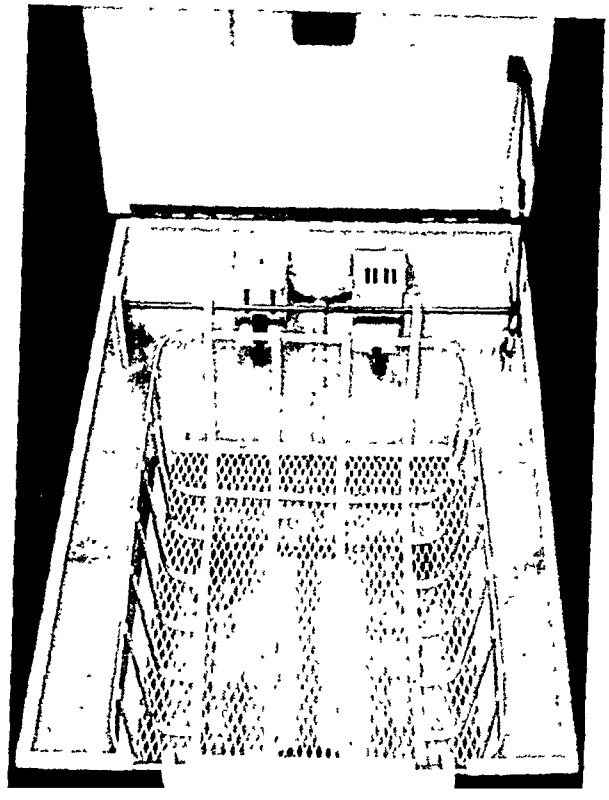


Fig 2. Interior view of the incubator. The rod and ratchet combination shown on the right permits lowering or raising of the head end of the bassinet.

present methods when properly performed can save many infants, especially premature babies. There always will be a certain number of infants who will die from intracranial hemorrhages, anomalies incompatible with life, or marked developmental deficiencies.

I. *Theories of Respiration*

Marchetti[5] refers to three hypothetical factors that may initiate the expansation of the lungs and thereby establish respiration in the newborn: the physical, chemical and biological. Under the first, the theory has been presented that the infant begins to breathe at birth as a consequence of reflex stimulation set up by the trauma resulting from labor. Marchetti points out, however, that when one considers how adverse and difficult labor may be and the injury that the newborn may sustain as a result, such a theory is obviously untenable. Other investigators propose that inasmuch as carbon dioxide stimulates the respiratory center, it is the increase in carbon dioxide tension in the blood of the newborn at the time of birth that initiates respiration. Eastman[6] has shown from his studies on the fetal blood that the baby will begin to breathe whether the carbon dioxide tension is either high or low. From the evidence that is available up to the present time, it appears that chemical factors do not entirely explain the onset of respiration.

The existence of rhythmic respiratory movements that simulate those of extra-uterine life has been demonstrated. This phenomenon may be considered the biological factor, for it is difficult to understand how such a vital function as respiration should suddenly become initiated as soon as the infant is born. Marchetti states that he is led to believe from all the evidence at hand that the mechanism of respiration biologically is established in intra-uterine life and assumes its vital function at birth. This function is awakened by a combination of the chemical factors considered in the previous paragraph. The biological theory leads one to consider the following statement of Eastman: "Instead of being an attempt to start something new, the treatment of apnea at birth now becomes an effort to preserve and safeguard a sensitive mechanism already in active existence."

II. *Analgesia, Anesthesia and the Newborn Infant*

Pressure from the laity has forced physicians to increase the use of analgesia and anesthesia. In many hospitals few labors are carried through with no drugs whatever. Wilson and his associates[7] admit that although the incorrect or excessive use of drugs may cause anxiety, as a rule such infants respond after a more or less prolonged period of apnea with cyanosis. Occasionally, however, a depression is encountered which is so deep that after a few shallow respirations the apnea recurs, and such babies can be kept alive only with the greatest difficulty. The important point is, that although few lives are lost as a result of the use of drugs per se, such infants cannot stand much additional asphyxia. This applies especially to premature babies. If in such cases a long deep anesthesia is employed, many of these in-

TABLE III.

The Influence of Obstetrical Analgesia and Anesthesia on the Newborn Child
Observations of Various Investigators

Author and Year	Opium Derivatives	Various Barbiturates	Scopolamine rectal ether, paraldehyde	Inhalation of ether	Nitrous oxide and oxygen
Eastman[4] 1936	———	———	———	Produces slight depression of O_2 saturation of fetal blood with no injury to fetus through anoxemia	In ratio of 85:15 or weaker for less than 5 min causes moderate degrees of fetal anoxemia with infant usually not harmed
Clifford[5] 1937	Unfavorable influence on newborn is in direct proportion to amount given and time interval before delivery.	No relationship exists between size of dose or time and condition of infant at birth	No effect is shown on infant attributable to the ordinary doses used of these drugs	Less than 1 ounce of ether inhalation has no effect on the infant	No relationship noted between gas-oxygen administration and infant's condition. No information given as to effect of various concentrations of anesthetic
Wilson[6] 1937	Exert powerful depressing effect and should not be used less than 2 hrs before delivery.	Depression of infant is not easy but if it occurs response to resuscitation is poor	Paraldehyde is most harmless of available drugs	Safe unless present in blood in high concentration for long period of time	Little danger to infant if 15% or more of O_2 is used. If O_2 ratio below this, asphyxiation of mother and baby will occur, and resuscitation may be difficult.
Teel[7] 1938	Given within 4 hours before delivery, followed by marked and sometimes alarming asphyxia	———	———	Prolonged maternal anesthesia prior to delivery with much less than 20% oxygen in the inhaled mixture results in varying degrees of and sometimes marked asphyxia in the newborn infant.	
Cole 1939 (Personal communication)	Within 4 hours of delivery morphine causes severe asphyxia (28% of newborns) while before 4 hours, much less asphyxia (17.7% of infants)	Small amounts not effective but large amounts (nembutal, 4 units*) cause severe asphyxia (14.7% of newborns)	Small amounts not effective but fairly large amounts (scopolamine 4 units**) may cause severe asphyxia. (12.8% of infants).	Ether anesthesia tends to reduce birth shock, although spinal anesthesia is better than ether in caesarean section.	———

*Nembutal, one unit = 1½ grains **Scopolamine, one unit = 1/150 grain

fants will die. They might recover from the narcosis or the asphyxia alone, but are overwhelmed when one is superimposed upon the other. If a traumatic delivery with deep anesthesia is anticipated, or other causes of asphyxia are present, or likely to occur, it would be safer to dispense with drugs. Table III summarizes the conclusions of various investigators concerning the influence of obstetrical analgesia and anesthesia on the newborn child.[8,9]

The evidence presented in favor of little or no drug therapy is further supported by the recent observations of Schreiber.[10] He concludes from his studies that the depressing effect on the respiratory center of birth analgesics given in greater than pharmacologic doses bears a direct relationship to the degree of apnea. The extent of the apnea has a direct relationship to the severity of the cerebral symptoms after birth. The severity of the cerebral symptoms is in direct relation to the amount of damage to the brain tissue. From these relationships, it appears that analgesics given in greater amounts than the pharmacologic dosage may in many instances be the causative factor of fetal anoxemia, with resultant cerebral damage in the newborn infant.

III. *Clear and Open Air Passages from Lips to Lungs*

Repeated attention to the air passages immediately after birth will reduce the incidence of cyanosis due to mucus and amniotic sac contents in the upper air passages, and cessation of cyanosis following such measures confirms the diagnosis of obstruction of the upper respiratory passages. Attempts to make the infant breathe should be refrained from until the passages are well cleared. This will prevent much aspiration of the substances which have been demonstrated at autopsy in the lungs of many infants.

IV. *Mouth to Mouth Insufflation*

This method of resuscitation is an old one. It carries serious risk of infection and depends largely for success on the experience and skill of the physician. His mouth serves as a mask and air is forced into the infant. It usually enters the stomach but if sharp, short, repeated puffs are made, a little may enter the trachea, especially if the head is held in hyperextension. Wilson believes that in the hands of the novice the method is always dangerous, and even after long experience, the possibility of ruptured air sacs is great. Over 14 cm. of water pressure will rupture the alveoli. Occasionally a baby is saved by its use.

V. *Direct Exposure Intubation and Intratracheal Insufflation of Gases*

When mild measures have been unsuccessful in the more serious forms of asphyxia neonatorum, the newborn infant may respond to insufflation.[11] With the infant type of direct vision laryngoscope, the tongue is easily depressed and the larynx exposed. The pharynx is quickly cleansed of any mucus with the little sucker and the laryngeal tube is introduced within the vocal cords and well into the larynx. Again, the sucker is used to aspirate any contained matter, mucus or other fluid. When it is ascertained that all obstructive material has been removed, the laryngeal tube is connected with the gas tube and insufflation of oxygen with or without carbon dioxide is begun.

The method has not been very popular in the resuscitation of premature infants. Flagg,[12] however, makes the

following statement to any objections which may arise: "If the infant to be resuscitated is premature, it is practical to use the tube employed for suction as an insufflation instrument. This tube is considerably smaller in diameter than is the ordinary endotracheal insufflation tube. With this technique, the suction tube is introduced into the small glottis, and suction is gently performed. The tube is then withdrawn and is attached to the insufflation tube, the mucus is blown out, and the tube is replaced as an insufflation tube."

VI. *Stimulation*

A. *Irritation of the Afferent Nerves*: Respirations should be stimulated gently for violent methods may traumatize the infant or aggravate existing birth injuries. To encourage deep breathing or crying, the skin may be rubbed, the soles of the feet thumped, or a small amount of ether dropped on the skin. This may be repeated from time to time as needed, but overstimulation should be avoided because it is fatiguing. This is particularly true of premature infants and weaklings. There is one mode of resuscitation which should never be used. It involves strong, even painful, afferent stimulation. The apneic infant is plunged into cold water or it is slapped hard and kneaded. No squeezing, pulling, or stretching of the body or limbs can induce the slightest inflation of its lungs, although the method of swinging the apneic and atelectatic baby, or the safer method of moving the body feetward and then sharply headward, may jerk the lungs partially open. If any other form of handling induces breathing, that result is induced reflexly, not mechanically.

B. *Chemical*: Mention must be made of medicinal treatment of asphyxia neonatorum. Lobeline has been used with rather indifferent results. It is undoubtedly a definite respiratory stimulant, but it is also a cardiac depressant. Nevertheless, Litchfield and Beilly[13] believe that asphyxia neonatorum of the central type may be overcome frequently by injection of alpha-lobeline hydrochloride into the umbilical vein. The drug will lower the threshold of the respiratory center to carbon dioxide stimulation and may be, if used in this way, a valuable adjunct in the resuscitation of the newborn.

Carbon dioxide is considered to be the most powerful stimulant for the respiratory center.[14] The inhalation of a mixture of carbon dioxide and oxygen is sufficient for almost all cases of moderate asphyxia. A close-fitting mask is held tight over the face and a small rubber bag, attached to the mask and filled with a mixture of 5 to 10 per cent carbon dioxide in oxygen is squeezed 10 or 15 times a minute. Usually a small, but sufficient, part of the lungs is thus inflated; and under the influence of the inhaled gases the baby begins to breathe. The administration of the gas is then continued by allowing the baby to rebreathe into the bag; and respiration soon becomes well established.

A few objections have been offered to the use of carbon dioxide with oxygen for the newborn. Some babies do not respond to the stimulus of 5 per cent carbon dioxide. The answer is that this is generally true only of those born in deep narcosis, and that in proportion as the sensitivity of the respiratory center is depressed by drugs or by asphyxia, higher percentages of carbon dioxide are needed to induce stimulation of breathing and muscle tonus. Another objection is that raised by Eastman on the basis of his extremely careful and valuable studies upon asphyxia neonatorum. In cases of asphyxis pallida, he finds in the blood, low oxygen, low pH, low alkali, high lactic acid and a more than normal pressure of carbon dioxide. He accepts the view that such conditions constitute an "acidosis" in the sense of an acid intoxication; and he infers that administration of carbon dioxide should exacerbate the intoxication. Eastman summarizes his investigations by stating that asphyxia neonatorum, in all of its manifestations, is an example of profound oxygen want. For this reason the one urgent necessity in its treatment is oxygen, and by the same token, the one urgent requirement in its prevention is oxygen. The weight of clinical experience, however, seems overwhelmingly against Eastman. Observers are unanimous in the belief that carbon dioxide is of extreme value in the treatment of asphyxia of the newborn.[15] In spite of excessive accumulation of carbon dioxide in the blood, additional carbon dioxide will cause stimulation of a depressed respiratory center. Oxygen renders the anoxemic respiratory center more sensitive to stimulation.

VII. *Mechanical Resuscitation of the Newborn*

Murphy[16] has adapted the Drinker respirator to the treatment of the asphyxia of the newborn. The apparatus as employed today has little if any place in the initiation of respiration in the newborn. In some instances it has been of great value for the reviving of the newborn infant which has once had normal respiratory action. However, its value is limited in the respiratory disturbances of the premature where the respirator cannot synchronize its motion to those of the premature infant.

Martinez[17] has employed the E. & J. Resuscitator. It is a positive and negative apparatus, and the pressure is exerted by the oxygen over the baby's face through a mask similar to that used in administering gas anesthesia. The apparatus is equipped with two tanks—one of oxygen and the other of a mixture of 90 per cent oxygen and 10 per cent carbon dioxide, so that either can be used with ease. The resuscitator is almost foolproof, as the positive and negative pressure ceases automatically when the child breathes of his own accord and it allows him to breathe the oxygen from the bag. If desired, the child may breathe the oxygen-carbon dioxide mixture through the inhalator attachment. Although Martinez has used the apparatus in more than 500 cases, observations by other investigators must be recorded before any definite evaluation of this resuscitator can be made.

SUMMARY

The number of premature infants who die each year has not greatly decreased. This has been one of the factors which have prevented a further drop in the infant mortality rates.

Although the cause of death in some of the premature infants has been intracranial hemorrhage, congenital anomalies, or deficiencies, many premature babies have died from infection, poor feeding, and failure to respond to the older methods of resuscitation.

An opportunity has presented itself which has permitted the establishment of isolation technique and the application of a definite feeding program in the care of the premature infant. The change in the management of these babies has resulted in a rather marked fall in the mortality rate after the second day of life. A temporary increase in the number of deaths during the first few days of life was checked by making arrangements to keep the temperature of the premature infant within the normal range from the moment of birth. In addition, simple up-to-date measures of resuscitation were employed with gentleness being the fundamental requirement.

In spite of a fairly satisfactory response, there exists plenty of room for improvement in the resuscitation of the newborn, especially the premature infant. The better the co-operation between the obstetrician and the pediatrician, the more benefit the general practitioner will receive from the results of their investigations.

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Book Reviews

Guiding Human Misfits, A Practical Application of Individual Psychology, by Alexandra Adler, M.D., research fellow in neurology, Harvard University; New York City, The Macmillan Company, 1938. Price, $1.75.

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The author of *Guiding Human Misfits* is the daughter of the founder of individual psychology, Alfred Adler. She herself has specialized in neurology, neuropsychology and psychotherapy both in America and in Europe, but still adheres most ardently to the fundamental psychology laid down by her father. Dr. Alexandra Adler emphasizes at the beginning of her book and throughout the entire small volume that the pattern of later life is set by the early formative years of childhood. She gives special attention to the treatment of neurosis in childhood, and considers it is better to be "a light house than to be a life boat," a message to all educators and parents. Statistical data and normal types are purposefully omitted by Dr. Adler who emphasizes her statements by citing case histories. An interesting chapter is the psychology of criminals, a subject which is often omitted in the majority of textbooks on psychology. This small volume should be helpful to physicians and social workers, as well as to educated parents and other lay people.

Human Pathology, by Howard T. Karsner, M.D., professor of pathology, Western Reserve University, Cleveland, Ohio; fifth edition, revised, cloth, 974 pages, 443 illustrations and 18 color plates; Philadelphia: J. B. Lippincott Company, 1938.

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This volume is divided into two parts, the first devoted to general pathology, and the second dealing with systematic pathology. Topics in both parts are treated with a detail and specificity that leaves no room for doubt. Previous editions have been adequately brought up to date, as attested by the lengthy and recent bibliographic lists at the end of each chapter. Throughout the text references are made to authors and studies concerned with the special topics under discussion.

Both as a textbook and as a concise reference for the practicing physician, the book deserves a place in every medical library.

A Biological Approach to the Problem of Abnormal Behavior, by Milton Harrington, M.D., Psychiatrist, Institution for Male Defective Delinquents, Napanoch, N. Y.; 459 pages; Lancaster: The Science Press Printing Company, 1938.

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This book presents a new approach to the problems of abnormal behavior, the mechanistic rather than the animistic theory of the function of the human mind. It is considered in two major parts, one dealing with psycho-physiology and the other with psycho-pathology. The physiological approach is based on the stimulus response and elaborated reflex action with stress on the sensory mechanism aroused by the stimuli and the form of the response. No attempt is made to embody the work of Pavlov although the current concepts of animal psychologists are included. The approach to the psycho-pathology is entirely mechanistic but no attempt is made to offer any validity for the theories formulated. Indeed, as the author himself indicates, these very approaches have not fulfilled most of the criteria essential for the diagnosis and treatment of mental diseases. The author stresses five different methods of making an adjustment. The thesis laid down is that behavior disturbances constitute one of these types of adjustment. The discussions are stimulating but not altogether adequate to cover the field of abnormal human behavior.

Synopsis of Clinical Laboratory Methods, by W. E. Bray, M.D., professor of clinical pathology, University of Virginia, director of clinical laboratories, University of Virginia Hospital; second edition; St. Louis: C. V. Mosby Company, 1938. Price, $4.50.

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Because of the need of keeping abreast with new clinical laboratory methods, Dr. Bray offers a second edition of his already popular work. In this new volume, modern methods have been introduced and old procedures have either been discarded or standardized. In addition, Dr. Bray has given clinical interpretation to some of the laboratory findings. Details have been subordinated to generalities hoping that the beginning student will have had supervised instruction in details. Dr. Bray has included several additional procedures in this second edition, the most important of which are serum phosphatase determination, titration of staphylococcus antitoxin in the blood serum, cough plate method for diagnosis of whooping cough, vitamin C titration from the urine, and the optimum dose titration of antigens for the Wassermann test. The second edition of this very practical book should receive a hearty welcome.

(Continued on p. 244)

The JOURNAL LANCET

Represents the MINNESOTA, NORTH DAKOTA *Medical Profession of* SOUTH DAKOTA and MONTANA

The Official Journal of the

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American Student Health Association
North Dakota State Medical Association
South Dakota State Medical Association
Medical Association of Montana
The Sioux Valley Medical Association
Great Northern Railway Surgeons' Ass'n

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MINNEAPOLIS, MINN., MAY, 1939

THE MEDICAL ASPECTS OF DENTAL HEALTH IN CHILDHOOD

Though much has been written and said about the medical aspects of dental health in childhood, it is fair to say that such an important subject can hardly be overemphasized. Maldevelopments and defects have their onset and perhaps their greatest effects on health in the formative years and the responsibility for proper prophylaxis and care should fall to the lot of physicians and dentists jointly.

It is beyond the scope of this discussion to more than mention such extremely formidable factors as healthy genetical anchorage and proper antepartum prophylaxis in dental health. The former is all too frequently deficient as is evidenced by common anomalies of development and dento-facial deformities. Since all the deciduous teeth are partially calcified at birth and even the first permanent molars calcify soon thereafter, it is obvious that prenatal influences likewise have an important bearing on proper odontoblastic, ameloblastic and other functions that are vital to sound teeth.

From earliest infancy, defects which are manifest or those which progress insidiously deserve the most careful coöperation of dentist and physician. Deformities, developmental defects, congenital disease and deficiency states are no doubt our first consideration. It has been repeatedly demonstrated that dental hypoplasia and caries can be influenced by diet and that children with "optimum" nutrition have less of such defects than those with ordinary or poor nutrition. The so-called "coeliac" type of diet with extremely high protein, monosaccharide and vitamin values (meat, egg, dairy products, banana, simple fruits, vegetables and cod liver oil) has been shown to effect "optimum" nutrition better than one rich in starches, fats and complex carbohydrates. Balance studies have further demonstrated that such a diet is quite adequate in calcium, phosphorus and iron and that excessive ingestion of these elements in some forms may result in reciprocal losses of other minerals from the body which may become detrimental.

In spite of our increased knowledge regarding nutrition, we find, as in other applications of fact, that practise is axiomatically slow. Adherence to a diet of essentials over the long period necessary for good results is difficult and the desires and whims of a child usually come to take precedence all too often. We must, therefore, remind our patients that calcification of the teeth is now regarded as a more or less continuous process. Biochemical changes from deficiency states, deformities and disease may not be evident in the tooth until very late.

The physician must be especially concerned with the known effects of inadequately treated prenatal disease, with refractory anemia and rickets attendant to prematurity and even with rickets occurring in apparently healthy babies receiving cod liver oil. Other vitamin deficiencies though quite uncommon may have an indirect effect on dental health. In the appraisal of a child's

health, one familiar with normal attributes can and should recognize thyroid, pituitary and other hormonal deficiencies early enough to preclude by treatment such sequences as late dentition, poor calcification and early caries. That these and especially the nutritional inadequacies mentioned have much to do with the etiology of dental caries can no longer be denied. A lack of proper balance of all these factors deprives the enamel of its ability to oppose the disintegrating effects of acids and bacteria in the mouth. The source of these harmful acids has been the subject of a great deal of speculation. If they result, as some contend, from the effect of bacteria on certain complex carbohydrates or on "fractions" of certain cereal grains fermenting in the oral cavity, it would seem prudent to employ a dietary regimen in which these possible offending factors have been eliminated before consumption. If caries has already begun in a child lacking in "optimum" nutrition, complete cooperation on the part of dentist and physician is especially important.

Correction of nutritional and endocrine faults and of diseased states affecting the child's teeth may task the ingenuity of one well equipped to understand child health. Painstaking operative dentistry on deciduous teeth and careful orthodontia have become recognized as fundamentals in a sound foundation for general health. The pathologic results of dental caries on the human organism are, of course, immediate and remote and the loss of effective masticating surfaces not only interferes with proper trituration of food but leads eventually to pulp decay and loss of the tooth. Infected teeth and alveoli serve as potent sources of disease and may be the cause of profoundly debilitating states. Despite the fact that the permanent teeth depend on the deciduous teeth for jaw growth and prevention of caries, when one is confronted with the question of removal of deciduous teeth before their natural time for exfoliation, it must be remembered that early removal is much to be preferred over possible disability from systemic invasion of bacteria.

If we will regard sound teeth as but one index of well ordered skeletal growth and treat them with the same care as we would any other skeletal part, we will have done much to advance child health in general.

E. S. P.

NO SUBSTITUTE FOR NURSING

Dr. Oliver Wendell Holmes in a lecture to his students, November 6, 1867, said, "A pair of substantial mammary glands has the advantage over the two hemispheres of the most learned professor's brain in the art of compounding a nutritious fluid for infants."

In spite of all our pediatric progress, no perfect substitute has yet been found for mother's milk. There is some element that enters into its composition, the exact nature of which may never be known. The personal convenience of the socially ambitious mother is frequently an obstacle to an ideal diet schedule. When the mother does not have a sufficient quantity of this "nutritious fluid," we must always encourage supplementary and discourage substitutional feeding so far as possible.

A. E. H.

STUTTERING

In a splendid orienting discussion of stuttering, Cobb and Cole[1] point out that speech, one of the most complex and phylogenetically new functions, is integrated at several levels. The lowest level includes the peripheral muscles of speech and their nerve supply from the medulla oblongata and defects in this mechanism produce different degrees of aphonia. Cortico-bulbar neurones comprise the next level and lesions of these films cause dysarthria. Lesions in the cerebellum, a coördinating mechanism of great importance, result in symptoms such as explosive, monotonous and "scanning" speech. The integration of speech is most complex at the cerebral level, and lesions in this part of the brain result in aphasia and agnosia.

The neurological pathology of stuttering is not known, but the observation that this type of speech defect runs in families is suggestive of cerebral defects of hereditary origin. Stuttering is often associated with a lack of clearly defined dominance of one cerebral hemisphere and also with ambidexterity and motor awkwardness. Since speech is closely related to the emotional life, stuttering has important psychoneurotic aspects. Emotional stress precipitates stuttering and amelioration of this stress relieves this symptom.

Variations and amalgamations of three principle types of therapy are used in the treatment of stuttering. The mechanistic method lays particular stress on exercises and this speech drill serves to correct bad phonetic habits. Psychological therapy is of especial value in removing the handicap of emotional tension. The neurological method of treatment involves the use of special exercises which favor the development of a clearly defined dominance of one cerebral hemisphere. Its use is limited preferably to patients in whom cerebral dominance is defective. In general the treatment of stuttering should be appropriately individualized, and liberal use should be made of various combinations of different therapeutic measures known to be of value.

C. A. S.

1. Stuttering: Cobb, Stanley, and Cole, Edwin M., Physiol. Rev. 19:49, (Jan.) 1939.

THE AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The American Congress on Obstetrics and Gynecology, which is to be held September 11 to 15 in Cleveland, Ohio, is one of the most significant of the forthcoming medical events. This Congress was proposed by the Central Association of Obstetricians and Gynecologists. Many national, sectional, and local societies of obstetrics and gynecology passed resolutions approving of the congress, and representatives of these societies petitioned the American Committee on Maternal Welfare, Inc., to sponsor the meeting.

groups of the problems involved in human reproduction and to a better understanding and coördination of effort among the groups who are participating in the Congress. A five-day program is being planned with group meetings in the mornings and joint afternoon and evening sessions. Scientific and educational, as well as technical or commercial exhibits will add to the value of the meeting.

It is to be hoped that many will avail themselves of the opportunity presented by this worthwhile program.

C. E. S.

BOOK REVIEWS—(Continued)

The Interns Handbook, by members of the faculty of the College of Medicine, Syracuse University, under the direction of M. S. DOOLEY, M.D.; 2nd edition, revised and reset, 523 pages plus index; Philadelphia: J. B. Lippincott Co.: 1938.

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The Interns Handbook, edited by the Syracuse University medical faculty, under the chairmanship of M. S. DOOLEY, M.D., is exactly what the title implies: a concise, comprehensive correlation of exact medical information that can be quickly located and utilized under emergency conditions. The information given is generally in full enough detail to solve indecisions in emergencies which the intern is constantly meeting.

The Interns Handbook is neither a compend nor a textbook. Neatly printed and conveniently bound in a pocket-size edition, this volume will help the young doctor entering his internship to correlate the hard-won knowledge represented by his medical diploma, with physician's skill needed at the bedside or in the presence of a hitherto-unseen patient in a coma.

There is an especially good section on drug monographs, condensed from the *U. S. Pharmacopoeia* and the A. M. A.'s *New and Non-Official Remedies.* Entirely new sections have been added on allergy, anesthesia, chest conditions, circulatory disturbances, coma, dehydration, food poisoning, fractures, head injuries, intern relations, local anesthesia, medical jurisprudence, medicine and social service, newer drugs, pregnancy test, resuscitation, selected nursing procedures, sex hormones, shock, solutions and vitamins.

Textbook of Bacteriology, by THURMAN B. RICE, A.M., M.D., professor of bacteriology and public health, Indiana University School of Medicine; 2nd edition, revised, 563 pages with 121 illustrations; Philadelphia and London: W. B. Saunders Co.: 1938. Price, $5.00.

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When many teachers expressed a desire for a shorter textbook of bacteriology, a book which would permit students to master at least the text in one semester, Dr. THURMAN B. RICE, professor of bacteriology and public health at the Indiana University School of Medicine, prepared such a volume. It proved valuable not only to students but also to physicians who wished to review the subject of bacteriology and found most books too long and too technical.

With this thought in mind, the author has described in detail only those technical processes which may be done by the practicing physician, limited in time, material and equipment. When more elaborate technic is needed, instructions are given for taking a sample to be sent to the laboratory. Thanks to the clear, well-written presentation of the subject made by Dr. RICE, a second edition of his book is now required.

The new edition is changed only to bring the text up-to-date, to fill in certain omissions, and to correct inaccuracies. Among the new subjects included in the second edition are the typing of the pneumococcus in the light of recent research, sulfanilamide therapy, and the use of tetanus alum-toxoid. Controversial material has been deliberately omitted on the theory that a textbook should contain only those phases of a subject which are rather definitely established.

Scarlet Fever, by GEORGE F. DICK, M.D., and GLADYS HENRY DICK, M.D.; Chicago: Year Book Publishers, Inc., 1938. Price, $2.00.

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In *Scarlet Fever,* Drs. DICK and DICK submit to the medical profession a definite report on this disease of their results over a period of thirty years. This volume can be looked upon as one of the indispensable basic references on this contagious disease. The history of scarlet fever, its etiology, pathological anatomy, symptoms, varieties, complications, diagnosis, prognosis and treatment are taken up in the order mentioned. Next is considered the preparation of scarlet fever toxin, the skin test for susceptibility, prophylaxis against scarlet fever, antibacterial immunity, and local and oral immunity. A bibliographical list of 188 is cited. This small volume can truly be considered a complete treatise on scarlet fever.

Anemia in Practice, by WILLIAM P. MURPHY, A.B., M.D., associate in medicine, Harvard Medical School; senior associate in medicine, Peter Bent Brigham Hospital, Boston; consultant hematologist, Melrose Hospital, Melrose, Mass.; 344 pages with 41 illustrations; Philadelphia: W. B. Saunders & Co., 1939. Price, $5.00.

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Dr. WILLIAM P. MURPHY, the co-discoverer of the liver diet for pernicious anemia, has assembled in one small volume all vital information concerning the anemias. He has emphasized especially those facts and methods which during the last few years have proven to be most useful and practical in the treatment of the anemic patient. The general conclusions as outlined in this book are the result of both research in the laboratory and intimate contact with and treatment of many clinical patients. The more common and usual clinical pictures of anemia are emphasized at the expense of unusual cases which might lead to confusion. This has given a very fundamental and practical aspect to this small volume which should be of particular value to the medical student, intern, and the practicing physician. No attempt has been made to bring together a complete bibliography.

Endocrinology, Clinical Application and Treatment, by AUGUST A. WERNER, M.D., F.A.C.P.; 672 pages illustrated with 265 engravings; Philadelphia: Lea and Febiger, 1937. Price, $8.50.

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Because endocrinology is one of the newest and certainly one of the most interesting departments of general medicine, Dr. WERNER has developed in one volume a complete yet practical survey of this broad field. Dr. WERNER suggests that the general practitioner is lost in the subject of endocrinology because of (1) the newness of the subject; (2) the lack of definite information as to the possible number of hormones and their functions; (3) the intricate interrelationships of the secretions of the ductless glands; (4) the difficulty of application of the results of animal experimentation to the human, which, aside from scientific value of such work, is the ultimate object of these investigations; (5) the variation of the potency of hormonal preparations used; and (6) the difficulty of determining individual dosage, which is influenced by the degree of function of the glands of the patient, the individual susceptibility of the patient, cellular receptivity, interaction of other endocrine secretions, and the effect of general metabolic factors and disease processes in each individual.

With these points in mind, Dr. WERNER has developed a volume which attempts to make the internist a good clinical endocrinologist. The anatomical structure and arrangement of the autonomic nervous system is first considered and is then related to the endocrine glands in general. The main bulk of this book, however, is a separate consideration of each endocrine gland, its anatomy, physiology and secretions. In the last few chapters are included general clinical syndromes such as obesity, osseous metabolism, the skin and endocrines, the hair and the teeth.

Dr. WERNER's *Endocrinology* is neither a reference book nor a practical treatise on endocrinology that can be used to advantage by the general practitioner. It will take its place among the many other general books on endocrinology, but it cannot be considered superior to many of them.

Future Meetings

MEDICAL ASSOCIATION OF MONTANA

The Medical Association of Montana will hold its annual scientific meeting at Butte, June 28, 29, 30. The program will be conducted under the chairmanship of Dr. J. J. Malee, Anaconda, with the assistance of Dr. P. E. Kane, Butte, and Dr. E. H. Lindstrom, Helena.

Guest speakers, from Washington University School of Medicine, St. Louis, Missouri, follow below.

Dr. Ernest Sachs, professor of clinical neurological surgery.
Dr. Dalton Keets Rose, associate professor of clinical genito-urinary surgery.
Dr. James Barrett Brown, associate professor of clinical surgery.
Dr. Charles Darrell O'Keefe, assistant professor of clinical obstetrics and gynecology.
Dr. Carl Vernon Moore, assistant professor of medicine.

The complete program of the meeting will appear in the June issue of the JOURNAL-LANCET.

PROGRAM
THE NORTH DAKOTA STATE MEDICAL ASSOCIATION MEETING

May 8, 9, 10, 1939
Fargo, North Dakota

May 8, 1939

Meeting of the House of Delegates.
Meeting of the North Dakota State Board of Health.

May 9, 1939

MORNING SESSION

9:00 Diagnosis and Management of the Surgical Gallbladder. E. M. Jones, M.D., St. Paul, Minn.
9:45 Maternal Mortality in North Dakota. John H. Moore, M.D., Grand Forks, N. Dak.
10:15 View Exhibits.
10:30 Medical Conditions Complicated by Pregnancy. Ralph A. Reis, M.D., Chicago, Ill.
11:15 Syphilis—Problems in the Treatment of Syphilis. H. E. Michelson, M.D., Minneapolis, Minn.

AFTERNOON SESSION

2:00 Dermatology for the General Practitioner. H. E. Michelson, M.D., Minneapolis, Minn.
2:45 Medical Legislation. L. W. Larson, M.D., Bismarck, N. Dak.
3:15 View Exhibits.
3:30 Diagnosis and Treatment of Eye, Ear, Nose and Throat Conditions Which Are of Particular Interest to the General Practitioner. A. D. McCannel, M.D., Minot, N. Dak.
4:15 Office and Hospital Management of Ano-rectal Diseases. L. A. Buie, M.D., Rochester, Minn.

May 10, 1939

MORNING SESSION

9:00 Emergency Orthopedic Problems. H. J. Fortin, M.D., Fargo, N. Dak.
9:45 Virus Diseases, U. S. Public Health Department.
10:30 View Exhibits.
10:45 An Approach to Some Common Behavior Problems. F. C. Rodda, M.D., Minneapolis, Minn.
11:15 Diagnosis and Treatment of Cardiac Emergencies. F. J. Hirschboeck, M.D., Duluth, Minn.

AFTERNOON SESSION

2:00 The Indication and Technique of Artificial Pneumothorax, Thoracoplasty and Extrapleural Pneumothorax in the Treatment of Pulmonary Tuberculosis. G. A. Dodds, M.D., San Haven, N. Dak.
2:45 Arterial Hypertension—Prognosis and Management. S. Marx White, M.D., Minneapolis,
3:30 View Exhibits.
4:00 Diagnosis and Treatment of Gastro-intestinal Hemorrhage. F. J. Hirschboeck, M.D., Duluth, Minn.

GREAT NORTHERN RAILWAY SURGEONS' ASSOCIATION

The Great Northern Railway Surgeons' Association will hold its 1939 meeting at Glacier Park Hotel, Glacier Park, Montana, June 30 and July 1.

Officers of the association are: Dr. E. H. Frost, Willmar, Minnesota, president; Dr. R. E. Weible, Fargo, North Dakota, first vice-president; Dr. W. F. Sihler, Devils Lake, North Dakota, second vice-president; Dr. H. W. Goehrs, St. Cloud, Minnesota, third vice-president; Dr. R. C. Webb, Minneapolis, Minnesota, secretary-treasurer.

AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS

The 24th annual meeting of the American Association of Industrial Physicians and Surgeons with the American Conference on Occupational Diseases and Industrial Hygiene will be held at the Hotel Statler, Cleveland, Ohio, June 5, 6, 7, and 8, 1939. A program of timely interest and importance will be presented by speakers of outstanding experience in all of the medical and engineering problems involved in industrial health. A cordial invitation is extended to all whose interests bring them in contact with these problems. Information regarding hotel accommodations, etc., may be obtained from A. G. Park, Convention Manager, 540 North Michigan Avenue, Chicago.

THE AMERICAN CONGRESS ON OBSTETRICS AND GYNECOLOGY

The first American Congress on Obstetrics and Gynecology is to be held in Cleveland, Ohio, September 11 to 15, 1939.

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DOCKET OF CASES

Mankato Physician Enters Plea of Guilty

Re: STATE OF MINNESOTA *vs.* ARTHUR W. ECKSTEIN, M.D.

On April 8, 1939, Arthur W. Eckstein, M.D., of Mankato, Minnesota, entered a plea of guilty to an information charging him with the crime of abortion committed on or about October 15, 1938, in the City of Mankato. Dr. Eckstein was also arraigned on a previous conviction (1934), and at the conclusion of which he was sentenced by the Honorable Harry A. Johnson, Judge of the District Court, to a term of not to exceed four years in a state penal institution. The Court was advised by legal counsel for the defendant, that Dr. Eckstein's license to practice medicine had been revoked by the Minnesota State Board of Medical Examiners on December 16, 1938, for procuring, aiding and abetting a criminal abortion. Counsel also stated that Dr. Eckstein was employed by a wholesale pharmaceutical house of Milwaukee, Wisconsin, and that he was engaged in sales work for that concern in the eastern half of Iowa. Following a lengthy plea by Dr. Eckstein's lawyer, the Court suspended the sentence and placed Dr. Eckstein on probation in charge of the State Board of Parole. The Court warned Dr. Eckstein that in 1934 he had served a sentence in the State Prison for a similar offense, and that any violation of his probation, would result in his having to serve the entire sentence.

Dr. Eckstein was born at New Ulm, Minnesota, December 8, 1888. He graduated from the Medical School at Northwestern University in 1912. He was first licensed in Minnesota, by examination, in the same year, but had his license revoked in 1934, following his pleading guilty to a similar offense. Despite the fact that he was permitted, upon his release, to take the medical examination for a new license, and was subsequently granted a license, he again became involved with the law over the performing of a criminal abortion, resulting in the present criminal charge and the revocation of his license by the Medical Board on December 16, 1938.

Minneapolis Physician Convicted of Manslaughter

Re: STATE OF MINNESOTA *vs.* GEORGE F. LEMKE

On February 25, 1939, a jury in the District Court of Hennepin County, returned a verdict of guilty against Dr. George F. Lemke, who formerly maintained offices at 512 Pence Building, Minneapolis. Dr. Lemke was charged with manslaughter in the first degree following the death, on December 10, 1938, of a 22-year-old St. Paul girl. The indictment against Dr. Lemke charged him with the death of the girl following a criminal abortion.

On March 3, 1939, Judge W. W. Bardwell sentenced Dr. Lemke to a term of 5 to 20 years in prison in connection with this case. Dr. Lemke's lawyer announced that an appeal would be taken and the Court granted a stay of 30 days in which to perfect the appeal. Dr. Lemke's license, as a physician and surgeon, was revoked by the Minnesota State Board of Medical Examiners on February 11, 1939, following a hearing held before the Medical Board as the result of the death of this girl.

The case was well handled for the State of Minnesota by W. G. Compton, Peter S. Neilson and Howard T. Van Lear, Assistant County Attorneys.

News Items

The attention of members of the American Student Health Association is called to an article on "Health in Colleges," by Jesse Feiring Williams, which appeared in the April, 1939, issue of *The Journal of Higher Education*. Dr. Williams presents an excellent resume of the findings of the Second National Conference on College Hygiene. All those interested in student health work will want to read this article.

Dr. Rolla Stewart of Minneapolis presented two papers before the Nicollet-LeSueur County Medical Society at St. Peter, Minnesota, April 18, 1939. The subjects of his addresses were: "Recent Developments in the Treatment of Compound Fractures," and "Internal Fixation of Fractures of the Neck of the Femur."

Dr. R. F. Hedin of Red Wing, Minnesota, has been awarded the annual prize of $250 given by the Chicago Surgical Society for original clinical and investigative work. Dr. Hedin's essay was entitled "Polypoid Disease of the Colon."

Dr. W. T. Judge, Milbank, South Dakota, was elected president of the Whetstone Valley medical society at the meeting held March 28, 1939. Dr. P. D. Peabody, Jr., of Webster, was named secretary. At this meeting, Dr. W. H. Karlins, Webster, spoke on "Fractures of the Hand" and Dr. P. D. Peabody, Sr., on "Bone Tumors."

The new $67,000 Tracy, Minnesota, hospital will be open within the next few weeks.

Dr. J. H. Garberson, Miles City, Montana, addressed the Mount Powell medical society recently on the subject of "Head Injuries."

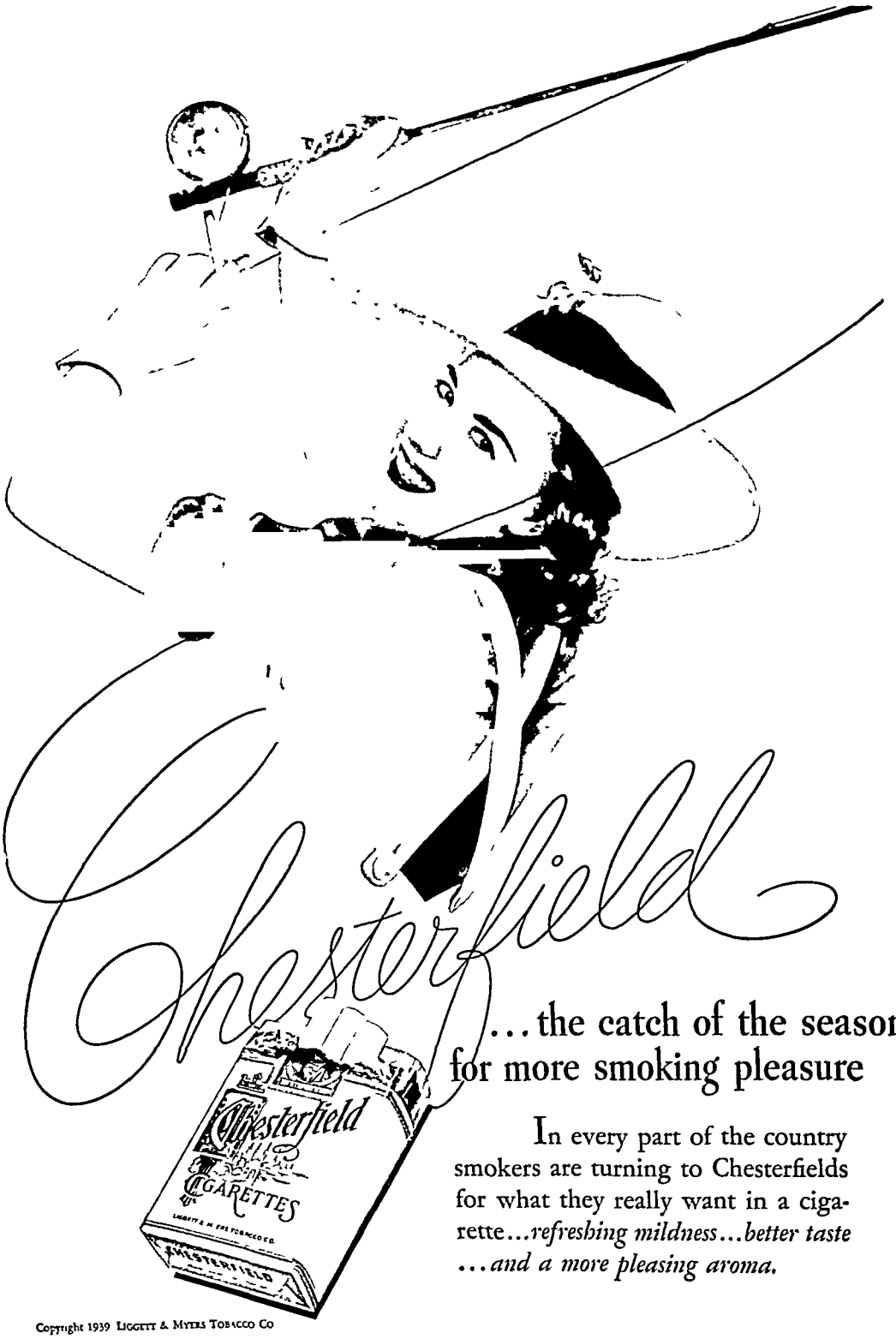
Dr. Laurence G. Pray, Valley City, North Dakota, has accepted a two-year appointment as instructor in pediatrics at Babies Hospital in connection with Columbia University, New York City. For the past two years, Dr. Pray has been resident pediatrician at Johns Hopkins hospital, Baltimore, Maryland.

Dr. Loyal Davis, professor of surgery at Northwestern University, was the principal speaker at the annual dinner of the St. Paul Surgical Society April 13, 1939.

Dr. Paul A. O'Leary of Rochester, Minnesota, has been appointed a member of the National Advisory Health Council by Secretary of the Treasury Morgenthau. The council consists of eight members who serve as an advisory committee to the surgeon general of the U. S. public health service in formulating the plans for improving the health of the nation.

Dr. Ruth Boynton, director of the Student Health Service, University of Minnesota, has been appointed to the state board of health by Governor Stassen.

Dr. A. R. Sorenson, Minot, North Dakota, has accepted the office of city health officer succeeding Dr. J. L. Devine.



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Dr. L. H. Rutledge has been named chief of staff at St. Mary's hospital, Detroit Lakes, Minnesota. Dr. O. O. Larsen is vice chief and Dr. Arnold Larson, secretary.

Dr. Donald L. Peterson has opened an office in Fargo, North Dakota. A graduate of the University of Minnesota medical school, Dr. Peterson held a three-year surgical fellowship at the Mayo Clinic, and was assistant in surgery to Dr. Virgil Counsellor. He is a native of Fargo.

Dr. George Turman of Missoula, Montana, was named chairman of the state board of health, succeeding Dr. E. M. Porter of Great Falls, at the board's semi-annual meeting held in Helena, April 6, 1939. Dr. L. H. Fligman of Helena was named vice-president.

Dr. E. M. Larson, Great Falls, president of the Montana Tuberculosis association for the past several years, was reëlected for another one-year term at the 23rd annual meeting of the association held in Helena, April 8, 1939. According to L. L. Benepe, deputy registrar of vital statistics, who made his report at the meeting, tuberculosis as a cause of death in Montana during 1938 dropped to eighth place.

Dr. A. F. Dworak, formerly of Montgomery, Minnesota, has moved to St. Paul.

Dr. Samuel Miller and Dr. Roy Lynde, Ellendale, North Dakota, have been reëlected president and secretary, respectively, of the Southern District Medical Society.

Dr. V. J. Larose, Bismarck, was elected president of the North Dakota Anti-Tuberculosis association at the 30th annual meeting held in Bismarck, April 4, 1939. He succeeds Dr. E. A. Pray of Valley City, who was named vice-president. Dr. J. Grassick of Grand Forks was reëlected honorary president and Governor John Moses, honorary vice-president.

Three Minnesota cities, Winona, Hibbing and Virginia, were announced as winners of merit awards in a 1938 city and rural health conservation contest conducted by the Chamber of Commerce of the United States in coöperation with the American Public Health Association. The announcement was made in Washington, April 18, 1939.

The Montana board of medical examiners has granted seven out-of-state physicians licenses to practice medicine in Montana. According to Dr. S. A. Cooney, Helena, secretary of the board, licenses were granted by reciprocity to Drs. O. J. Graham, Salt Lake City; Harrison D. Huggins, Hillsboro, Oregon; Frank A. Mills, Powell, Wyoming; J. P. Ohlmacher, Missoula; W. D. O'Gorman, Warm Springs; and J. R. Thompson, Ravenna, Ohio.

The Minnesota Pathological Society heard Dr. Jesse G. M. Bullowa of New York City speak on "The specific treatment of the pneumococcic pneumonias: the choice of a remedy," April 18, 1939, at the University of Minnesota Medical School Institute of Anatomy.

The maternal child welfare committee of the North Dakota State Medical Association coöperating with the health department, has arranged a series of one-day conferences for the purpose of curbing infant mortality. Dr. R. E. Pray, Fargo pediatrician, is discussing advanced methods of caring for premature infants before physicians and nurses in 16 communities. The conferences opened at Bismarck April 19 and will continue until May 26, when a meeting will be held in Fargo.

An all-day postgraduate course in the care of mothers and babies was given for the physicians of Winona, Minnesota, and surrounding communities April 26, 1939. The course was arranged under the auspices of the state department of health, the University of Minnesota and the Minnesota State Medical Association. The faculty for the course included Dr. R. D. Mussey, Rochester, Dr. E. D. Anderson, Dr. C. J. Ehrenberg and Dr. E. S. Platou of Minneapolis.

Minnesota's physically handicapped children will receive medical examination and advice at several field clinics planned for May and June by the Division of Services for Crippled Children of the State Board of Control. The schedule is as follows: Crookston, May 13; Austin, May 20; Detroit Lakes, June 3; and Aitkin, June 10. All physically handicapped children under 21 years of age who cannot pay for medical care are eligible.

Dr. R. H. Wilcox, formerly with the South Dakota State Health Department at Pierre, is now in Astoria, Oregon.

The Vancouver Medical Association is sponsoring summer school clinics June 6 to 9, 1939, at Vancouver, B. C. Information may be secured from Dr. W. W. Simpson, secretary, 203 Medical-Dental Bldg., Vancouver, B. C.

Dr. David Gaviser, Minneapolis, is now associated with Dr. R. F. Werner in International Falls, Minnesota. Dr. Gaviser was graduated from the University of Minnesota Medical School in 1936.

Necrology

Dr. J. M. Scanland, 65, former superintendent of the Montana state mental hospital at Warm Springs and prominent Montana physician for many years, died March 14, 1939, at his home in Imola, California. Dr. Scanland had been president of the Napa state hospital at Imola the past 15 years.

Dr. Henry H. Helk, 60, Minneapolis, Minnesota, died March 23, 1939. Dr. Helk was former chief of staff at St. Barnabas hospital.

Dr. Herbert F. Kenny, 52, died at his home in Waukesha, Wisconsin, April 14, 1939. Dr. Kenny, who practiced in St. Paul, Minnesota, for 12 years, had lived in Waukesha since 1933.

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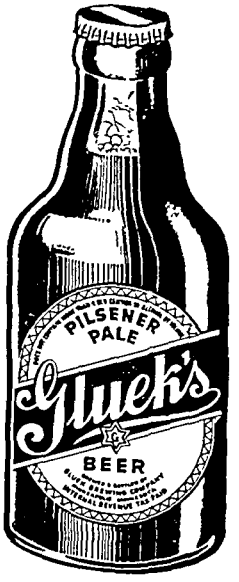
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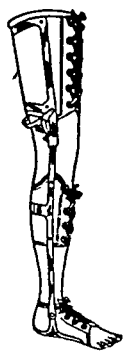
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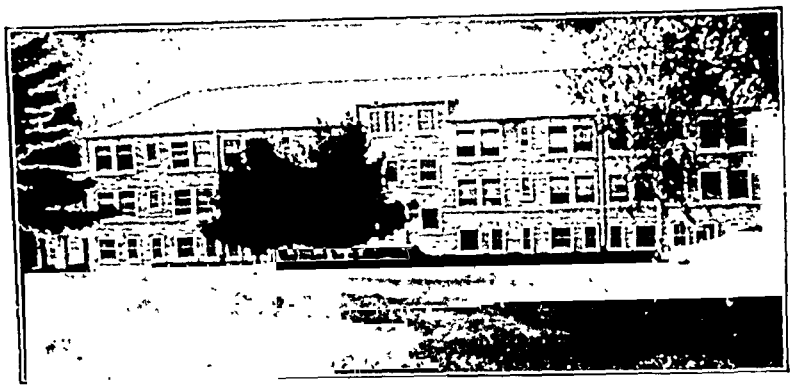
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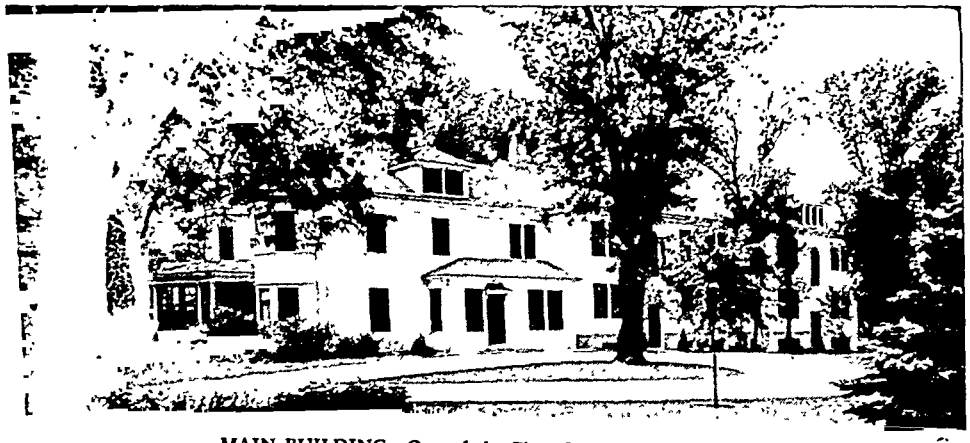
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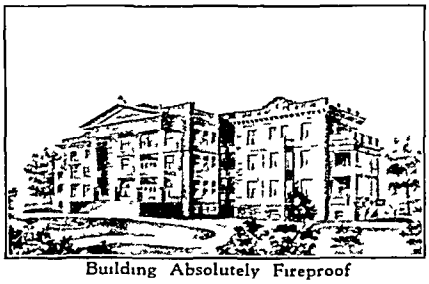
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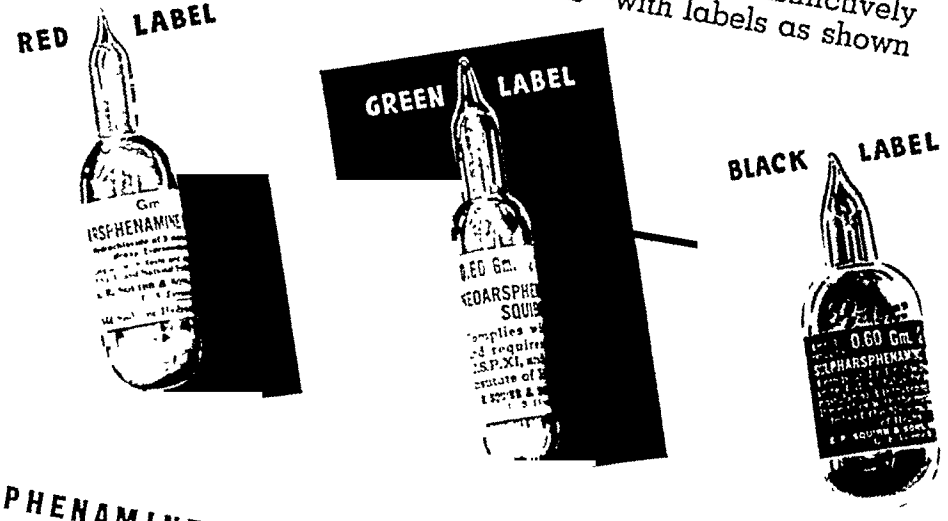
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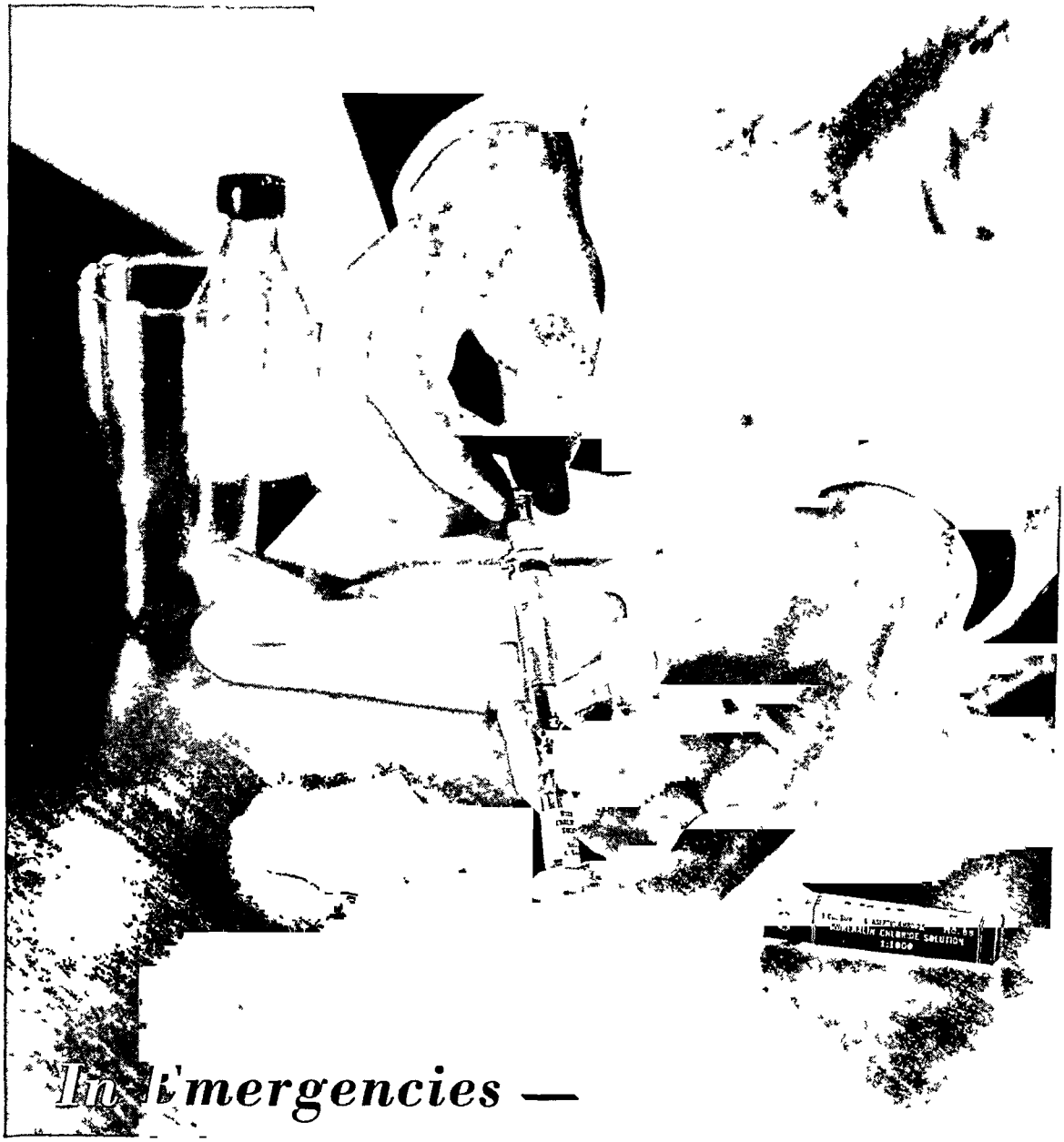
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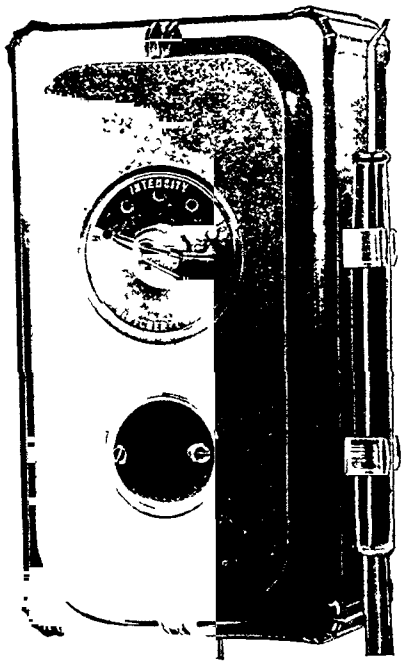
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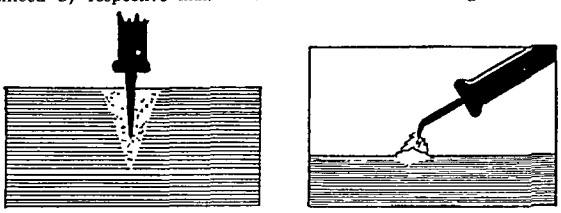
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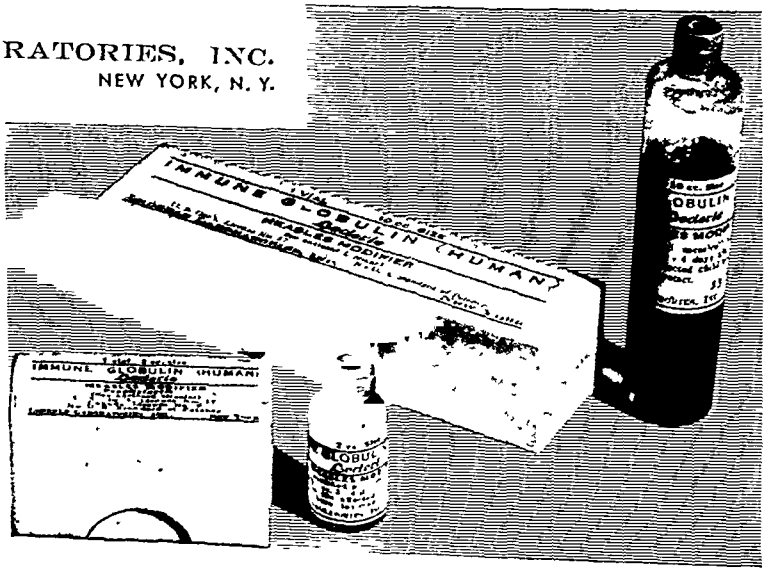
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[1] Levitas, Irving M.: Treatment, Modification and Prevention of Measles by Use of Immune Globulin (Human), J.A.M.A., 1935, *105*, 493.

[2] Laning, G. M. and Horan, T. N.: Immune Globulin Used as a Preventive and Modifier of Measles, Jour. Mich. Med. Soc., 1935, *34*, 772.

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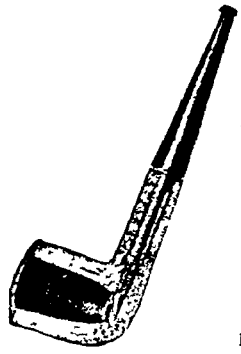


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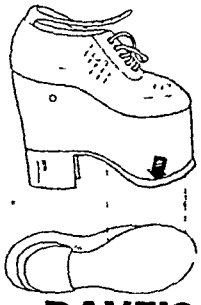
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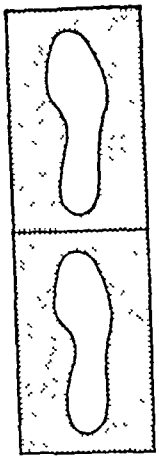
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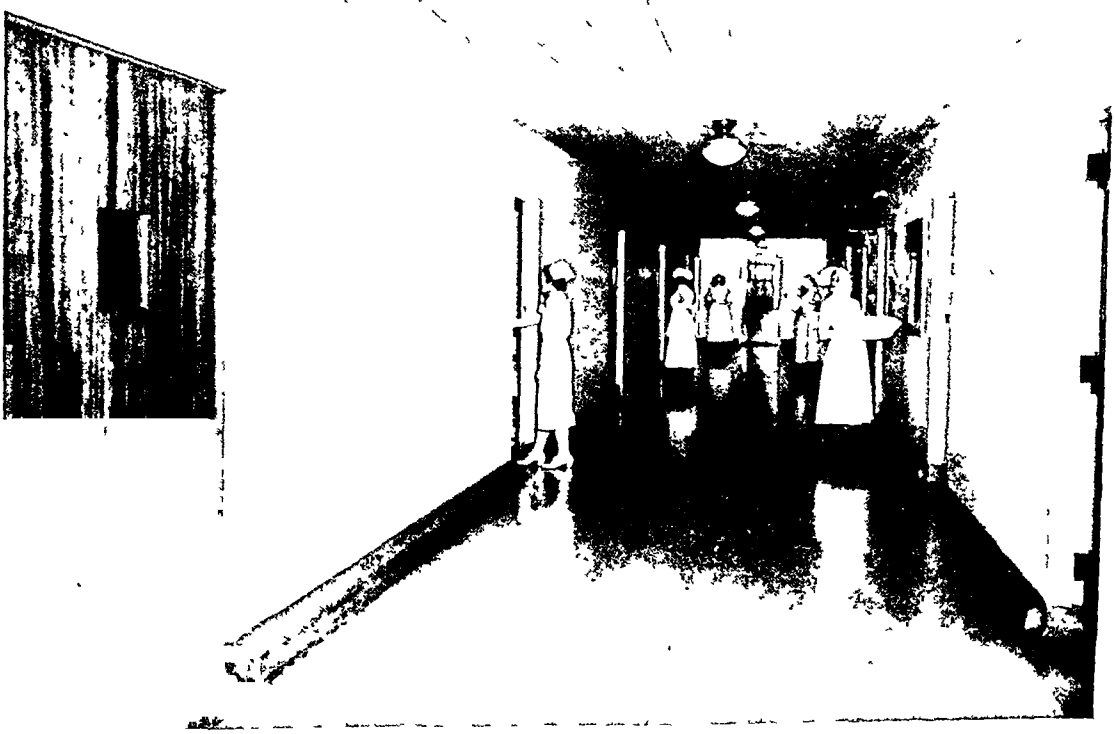
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(1) Schmidt, S. G.: Basal Anesthesia With Sigmodal, J. Lancet, 59: 26 (January) 1939.

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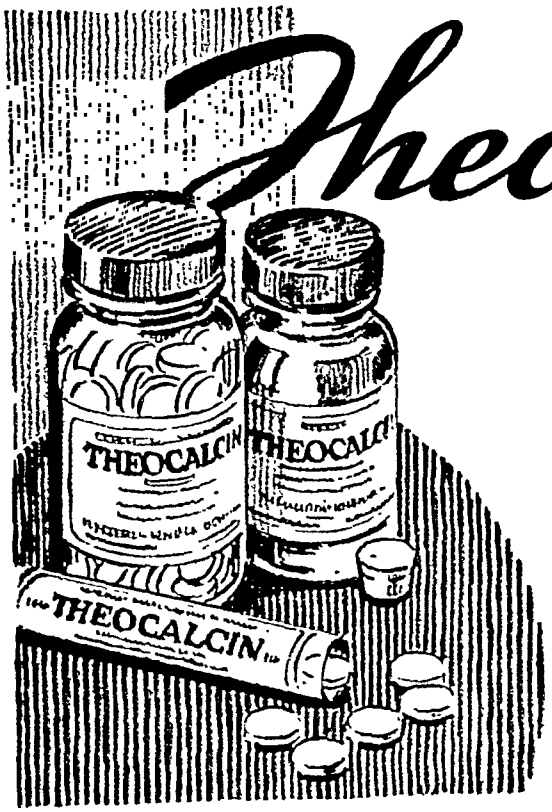
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Howard C. Naffziger, M. D.
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ADDRESS ALL CORRESPONDENCE TO 40 EAST ERIE STREET, CHICAGO

Non-Parasitic Cysts of the Liver*

Fred F. Attix, M.D., F.A.C.S.
Lewistown, Montana

CONTRIBUTORS to the literature are generally in agreement that non-parasitic cysts of the liver give no characteristic symptomatology. Preoperative diagnosis is infrequently made and the exact pathological condition is discovered accidentally at the time of operation, when some other disease is presumed to exist. Several surgeons of wide experience have told me that they have never seen a case of non-parasitic cyst of the liver in their practice. It should be considered more frequently as a possibility in the differential diagnosis of conditions involving the right upper quadrant.

Non-parasitic cysts of the liver have been found to exist at all ages but are most frequently reported as occurring in women from 40 to 60 years of age. They are usually of slow growth which often accounts for the delay and variation in the symptomatology and, in some cases, assume importance only when such complications arise as hemorrhage in the cyst cavity[1] or torsion of the cyst pedicle.[2] Exploratory operation is necessary to make a correct diagnosis; to relieve the condition by surgical procedures, the methods most frequently employed are resection, partial or complete, or marsupialization. Recovery with excellent end results is obtained after operation in the majority of cases.

Moschowitz[3] published the results of his extensive investigations in 1906 and concluded that the non-parasitic cysts of the liver originate in aberrant bile ducts, which he was able to demonstrate in the acini and in the capsule of Glisson. The histopathological sections of the cyst wall included with my case report seem to conform to this theory. Some authors have proposed various classifications for non-parasitic cysts of the liver. The one suggested by John F. X. Jones[4] based on the origin of the cysts seems to be the most satisfactory and complete. Contributors to the literature during 1938 were Ochsner[5] and McCaughan and Rassieur.[6] Ochsner reported a case of "Unilocular Cyst of the Liver," upon which he had done a partial resection of the cyst wall with drainage (1929). One year later (1930) he reopened the abdomen and did a ventro-suspension of the uterus. The liver did not reveal any evidence of recurrence of the cyst and only a thin band of connective tissue was observed where the previous drainage tract existed. McCoughan and Rassieur presented a paper on "Non-Parasitic Cysts of the Liver: A Report of Two Cases and an Analysis of the Literature," at the December, 1938, meeting of the Western Surgical Association. Both of their patients made uneventful recoveries after marsupialization and drainage.

The complete report of my case is submitted as follows:

* Case history with illustrations used at the December, 1938, meeting of the Western Surgical Association, Omaha, Nebraska, in discussion of Drs. McCaughan & Rassieur's paper.

CASE REPORT

The patient was a housewife, age 49, height 5′ 10″, weight 155 pounds. *Menstrual History:* Menstruation began at age 17, a 28-day cycle of three to four days duration. The flow was scant until she reached age 30, then it was moderate. She had no pain. The past eighteen months she had noted occasional irregularity. Last normal period was February 21, 1938. *Past Illnesses or Injuries:* She suffered a compound fracture of the left tibia in 1905. This was complicated with a low-grade infection and osteomyelitis requiring sequestrectomy (1925). Prompt recovery occurred after this operation. Tonsillectomy was performed in 1912. A cesarean section in 1919; indication, a central placenta previa. She had lobar pneumonia in 1920. *Present Illness: Chief Complaint:* Four years ago first experienced a gradually increasing pressure discomfort and a sensation of constriction along the right costal margin, especially noticeable when any tight clothing was worn.

Physical Examination: The skin was smooth and clear. The muscle tone was good. Eye, ear, nose and throat were negative; thyroid was negative. There were no palpable glands. Chest was well developed and the lungs were clear. Heart was normal in size, tones regular, clear and of normal intensity. *Abdomen:* There was a firm low midline postoperative scar. The liver border was rounded and palpable six centimeters below the right costal margin. In this region there was a slight tenderness on palpation and also an increased area of liver dulness. The colon was low and not distended with gas. Pelvic examination was negative. *Laboratory Findings: Urine:* amber, clear, acid reaction, specific gravity, 1025; negative for sugar, albumin, bile and casts. Blood count: hemoglobin, 88 per cent; color index .78; coagulation time, 4 minutes; erythrocytes, 5,620,000; leukocytes, 7,450. Differential Count: small lymphocytes, 13 per cent; large lymphocytes, 10 per cent; large mononuclears, 3.5 per cent; transitional juvenile, 4.5 per cent; polynuclear, neutrophiles, 64.5 per cent; eosinophiles, 4.5 per cent; basophiles, 0.5 per cent; icterus index IV; van den Bergh's test, no reaction. Blood group IV. *Gastro-intestinal Tract X-ray Series:* The stomach was in an oblique position, the pyloris open and the duodenal cap regular. No six hour residue or filling defect was noted. These were displaced laterally to the left upper quadrant. The caput coli and hepatic flexure were displaced downward and the remainder of the intestinal tract displaced to the left. A large indistinct shadow, with an irregular calcified area, was seen below the right costal margin which resembled a hydrops of the gallbladder. *Cholecystography:* (January 14, 1938, oral administration of the dye). The dye-filled gallbladder shadow was seen displaced downward and to the right. It was elongated and narrow. The calcified area was above. The indistinct shadow extended beyond the gallbladder shadow on all sides. Polycystic kidney or retroperitoneal tumor should be considered as a preoperative diagnosis. *Intravenous Urography:* (January 27, 1938). A normal left kidney pelvis filled with dye was present. The right kidney pelvis was not visualized in any of the films. *Barium Enema:* (February 11, 1938). On fluoroscopic examination the hepatic flexure and caput coli were displaced downward, the balance of the colon occupying the left half of the abdomen. There were no filling defects noted. *Preoperative Diagnosis:* The following diagnosis was made: (1) hydrops of the gallbladder; (2) polycystic right kidney; (3) mesenteric tumor.

Operation (February 28, 1938): The operation was performed under gas-ether anesthesia. The abdomen was opened through a high right rectus gallbladder incision. A dome-like grayish mass which resembled a huge hydrops of the gallbladder was present. No other viscera were seen as it filled the incision. Gauze packs were adjusted to prevent soiling, after which a trocar was inserted through the thickened wall and one thousand

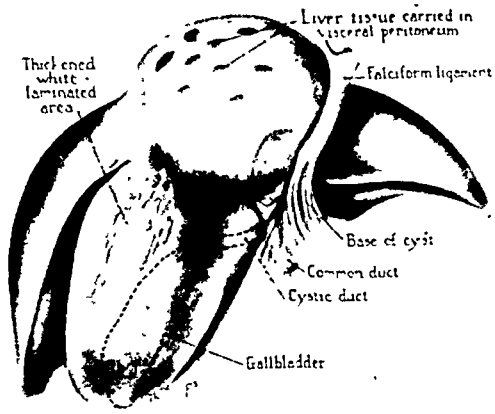


Fig. 1. The large cyst separated and displaced the lobes of the liver with the wedge like effect of its growth. The wall was elevated on the superior, anterior and inferior liver surfaces, carrying in advance with the growth of the cyst wall the visceral peritoneal layer, which was studded with thin, isolated islands of liver tissue. The base was attached to the liver ligaments and blood vessels located deep in the hilum posteriorly and above the entrance of the hepatic ducts.

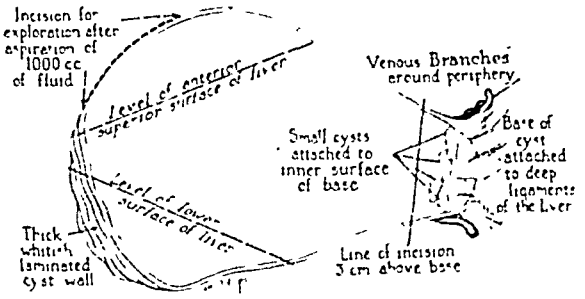


Fig. 2. Schematic Drawing of the Cyst. After aspiration of the cyst contents, the wall was incised and the left hand was inserted into the cyst cavity. This facilitated in palpating and separating the collapsed cyst wall from its cleavage to the liver tissue. Four small cysts attached on the inner surface of the base were destroyed by morcellation. Numerous venous branches of the hepatic vein surrounded the outer wall at the base.

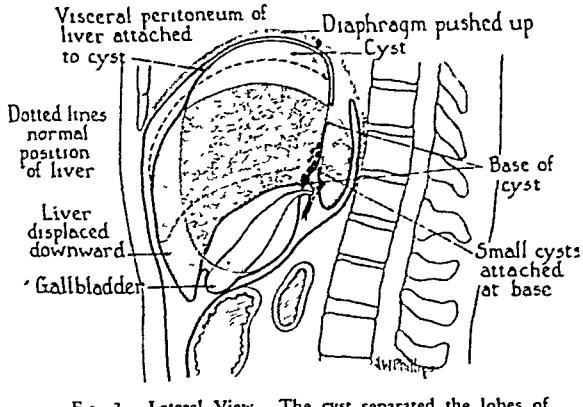


Fig. 3 Lateral View. The cyst separated the lobes of the liver and markedly displaced the right lobe laterally and downward. The elongated gallbladder was also displaced downward and backward and was attached to the posterior surface of the cyst wall by visceral peritoneal fold

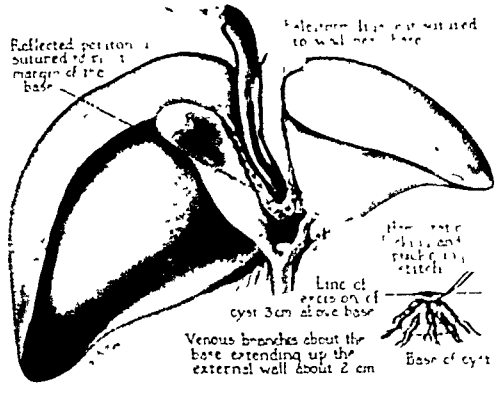


Fig 4. The visceral peritoneal covering of the cyst wall was incised and reflected laterally. Following the removal of the cyst this peritoneal flap was used to cover and approximate the liver lobes by suturing the margin to the remaining base of the cyst. The gallbladder which was detached except the cystic duct and artery was elevated and its peritoneal flap was sutured to the liver hilum. The base of the cyst was covered by the approximation of the lateral flaps of the cyst wall. One dressed Penrose drain was placed down to the base

cubic centimeters (1,000 cc.) of turbid, gelatinous, viscid, greenish fluid was slowly aspirated from the large cyst cavity. After the collapse of the cyst wall, an elongated mobile but otherwise normal appearing gallbladder was seen displaced downward and to the right, as was the right lobe of the liver. The duodenum and pyloric end of the stomach were displaced laterally to the left. The trocar was removed and the opening was enlarged in the wall of the cyst. The big cavity appeared trabeculated due to bands of fibrous tissue in the cyst wall. It was ascertained, by inserting the left hand into the cavity, that it extended deep in the liver hilum, the cyst wall displacing the falciform ligament to the left and also extending above the superior surface of the liver, carrying in advance a reflection of the visceral peritoneum of the liver, in which was incorporated many thin islands of liver tissue. This elevation impinged on the right antero-inferior reflection of the diaphragm. It also involved the anterior margin of the liver and extended downward to the level of the umbilicus and also along the inferior surface of the liver to a point above the entrance of the hepatic ducts which was near the source of its origin. The right lobe of the liver was displaced down and to the right by the wedge-like effect of the slowly expanding growth of the cyst. The thickened anterior wall contained an irregular area of calcification. The elevated visceral peritoneum was incised and reflected laterally from the cyst wall and, with the aid of the palpating fingers within the cyst cavity, the wall was resected from its line of cleavage to the liver tissue, gallbladder and hepatic ducts to the source of its deep vascular and fibrous attachment in the hilum. Several short venous branches surrounded and extended up the outer wall (approximately 3 cm.) at its attachment. Within the inner wall, originating from this base, were seen a cluster of four small sessile dark-bluish cysts which were removed by morcellation. Their contents were clear, thick and gelatinous. The cyst wall was resected above the origin of the larger venous branches and the cut margin was sutured with locking hemostatic catgut stitches and approximated to cover the base. Practically a complete resection of the cysts was accomplished. The reflected peritoneal flap and falciform ligament were sutured to the base in a manner so as to approximate the widely separated lobes of the liver and provide peritoneal covering for their exposed surfaces. The gallbladder, which was attached only by the cystic duct and artery, was elevated to a normal position and its free resected peritoneal margin was sutured. A dressed Penrose iodoform gauze drain was inserted, extending from the base to the upper end of incision in the epigastric angle. The operative incision was closed in layers and three silkworm tension sutures were inserted.



Fig. 5. The stomach and duodenum was displaced laterally to the left. The caput coli and hepatic flexure was displaced downward to the pelvic brim.



Fig 6 Intravenous Urography. Left kidney, pelvis, and calices were seen No dye shadow was seen in the right kidney region (Film retouched)

Postoperative Notes: There was a slight bile-stained mucous drainage for the first week. The drainage material was removed on the twelfth postoperative day, after which the sinus tract promptly closed. The convalescence was normal and the patient was discharged from the hospital on the twenty-third postoperative day. She has been in excellent health since the operation, nine months ago.

Pathological Report: One-half of the tumor tissue was forwarded to Dr. J. J. Moore, Moore Clinical Laboratory, Chicago, Illinois. His report is as follows: "The specimen consists of a 13x7x6 cm mass of thick fibrous tissue. The walls are composed of several layers which can be separated. The 'outer' covering is thick and roughened The 'inner' covering is smooth. The walls are laminated and are composed of thick, hyaline material. There is no gross suggestion of echinococcus daughter cysts. *Microscopic Diagnosis:* The sections consist of a hyaline and cellular fibrous tissue on the inner surface gradually changing to a tissue with few cells and then to one with dense fibrous tissue in which are occasional bile ducts and small islands of compressed liver cells. In one area are a few small cysts lined by columnar cells. There is no evidence of malignancy. Multilocular cyst of liver. Further study will be necessary to determine origin. MOORE CLINICAL LABORATORY (Signed) J. J. MOORE, M.D." *Additional Microscopic Description* (November 14, 1938): "Sections of several parts of the cyst including the walls show mostly dense hyalinized connective tissue with collections of round cells. Occasional ducts both small and large are noted lined with cuboidal epithelium. These are probably bile ducts inasmuch as occasional collections of liver cells are noted in association with them. A collection of dilated ducts is also noted. These have cuboidal to cylindrical epithelium. Likewise, the lining of the larger cyst cavity has a cylindrical and cuboidal cell lining. One cystic cavity contains degenerated lining. MOORE CLINICAL LABORATORY (Signed) J. J. MOORE, M.D." Dr. Thomas J. Walker, Walker Laboratories, Great Falls, Montana, examined the remaining portion of the tumor. His report is as follows: "Cyst removed from liver. Cyst wall is composed of connective tissue with a



Fig 7 *Cholecystography.* The dye filled gallbladder is displaced downward to the right It is narrow and elongated A shadow was seen that extends above and below the gallbladder (The film has been retouched to outline the margin)

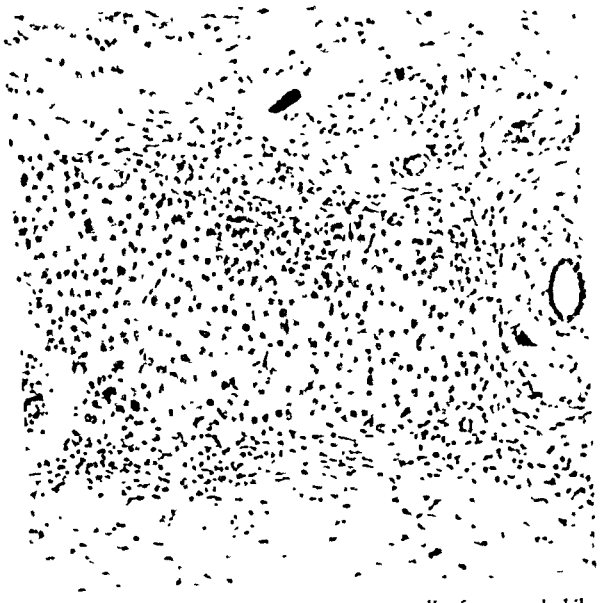


FIG 8 Liver cells in the fibrous tissue wall of cyst with bile duct. J. J. Moore, pathologist, Chicago, Illinois



FIG. 9. Cluster of dilated ducts embedded in fibrous tissue. J. J. Moore, pathologist, Chicago, Illinois.



FIG 10. Edge of large cyst showing cylindrical and cuboidal cell lining J J Moore, pathologist, Chicago, Illinois

tendency to formation of lamella. Connective tissue varies in density from dense, fibrous tissue to richly vascular, granulation tissue. I am unable to give an exact diagnosis but I am inclined to think that this is an echinococcus cyst notwithstanding the fact that no hooklets or scolices were demonstrated. (Signed) THOS. J. WALKER."

COMMENTS

1. The literature records but few correct preoperative diagnoses of non-parasitic cysts of the liver. It was not considered in the differential diagnosis of this case.

2. Bile duct retention cysts of probable congenital origin are reported with the case history.

3. Resection, partial or complete, is the method of choice, when advisable.

4. Practically a complete resection of the large cyst and a destruction of the smaller cysts by morcellation was accomplished with a prompt recovery of the patient.

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Limitations of the Non-Padded Plaster Cast

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THOUGH plaster splints have been used in the treatment of fractures for many years, the direct application of plaster to the skin has always been considered dangerous, because this non-yielding material can so easily cut off circulation in the fractured limb. Only in recent years, after Böhler developed the technique in his clinic, has the non-padded cast come into general use. Of its advantages he writes,[6] "The treatment of any fracture has two constant requirements; good reduction and uninterrupted fixation until bony union takes place. The skill of the doctor is not usually taxed as much in the reduction of the fracture as in its maintenance in good position. In the majority of cases the non-padded plaster cast affords the best means of maintaining the fragments in good position." In the course of several years experience with non-padded plaster casts, we have been convinced that this type of splint is of material help in handling many fractures. Clinical observation, however, has shown us that the limitations and dangers of the method are important.

The following cases have been selected as showing two types of trouble which may develop from the use of these casts.

CASE 1. The patient, a 55-year-old man, sustained a simple fracture of the lower end of his right tibia. One hour after the injury, a physician applied a non-padded plaster cast, extending from the toes to the knee. The cast having been put on in the physician's office, the patient was sent home with instructions to come by train to one of our hospitals the following day. The patient stated his foot pained him severely all night. When examined the following morning at the hospital, the uncovered toes appeared white and felt cold. The cast was removed, but there was no evidence of circulation in the foot. Anesthesia extended to a line about three inches above the maleoli. The circulation did not return, making it necessary to perform a lower leg amputation three days later.

CASE 2. A male, 20 years of age, in good physical condition, sustained a simple fracture of his femur. As there was no overriding of the fragments, his physician applied a non-padded plaster cast including the hip, knee and ankle joints. The patient stated he had considerable pain in his foot the first day after the application of the cast, although he had but little pain in the region of the fracture. He was referred to one of our hospitals two weeks later because a necrotic area had developed on the dorsum of his foot from pressure of the cast. The slough was about two inches in diameter and involved all layers of the skin. (Fig. 1). After two months, the ulcer had healed sufficiently to warrant the placing of grafts over the area. This patient is at a permanent disadvantage with a skin grafted area on the dorsum of his foot.

If one is to use this type of cast, he should follow in detail the outlined technique. Even under the best conditions, one must use great care in applying non-padded casts. Schnek,[7] who worked out this method of treatment with Böhler, has written, "We have paid dearly for our experience and I hope others will reap the benefits of it." Not only must the cast be accurately applied, but the following precautions must be observed in the selection and care of the case:

1. The cast should not be applied if there is evidence of impaired circulation in the limb distal to the break.

2. The cast should not be applied if there is extensive injury to the soft parts, or if the skin is badly injured. A small skin lesion need not prevent the use of such a cast provided the site is such that a window can be conveniently cut in the plaster to expose the area.

3. The cast should not be applied in the presence of marked edema. In some cases one may wait until the swelling subsides; in others it is best to select some different type of fixation.

4. The limb should be elevated after the application of a cast. This elevation should be high enough so that the limb being treated is entirely above the heart level in order that gravity may aid the return of blood from the part. This elevation should be maintained as long as there is any danger of swelling. We have found the method of placing the casted leg on a Braun splint with elevation of the foot of the bed to be best for enhancing its circulation. (Fig. 2).

5. The encased limb should be watched by competent nurses and doctors, experienced in this type of work. Any surgeon who applies such a cast should be willing to see his case during the night.

6. The cast should be applied only if the surgeon has had considerable experience with the use of plaster. As a beginner in surgery starts simply, so should the user of plaster start simply. When he is learning the method, only minor cases should be selected for this type of treatment; and he should be sure to see that the limb is elevated and watched even in these relatively easy cases.

7. The cast should be split if the patient complains of pain or if there is evidence of impaired circulation. It is true a split cast will not hold the fragments in as good alignment as an intact one, but as Schnek[7] has said, "Even a pronounced deformity of the bone due to a splitting of the cast is preferable to the loss of a limb." We have found it possible in some cases to reinforce these cut splints before letting the patient up, and to continue the treatment as originally planned. In other cases, it has been necessary for us to reapply the cast or use some other type of fixation.

8. Because pain is an important clue to the fact that the circulation of the encased limb is being impaired, the patient should not be given morphine after the application of a non-padded cast. We usually use this drug when the patient is first seen, but for subsequent discomfort he is given a mild hypnotic such as phenobarbital.

If the above precautions had been observed in the first case cited, we feel that the patient would not have lost his leg. Non-padded plaster casts should not be used for the primary treatment of patients in the physician's office. We also believe they are unsatisfactory for

the care of a patient in his home, where proper elevation may be difficult to obtain and where there are no trained assistants to see the case. It is essential to have the patient in a hospital for observation at least during the first 24 hours, and longer if there is any indication of swelling.

We also feel that this is an unsatisfactory splint for transportation. Best suited for this purpose, we believe, are the splints recommended by the Committee on Fractures of the American College of Surgeons, the Murray-Jones hinged splint for the arm and the Keller-Blake hinged half ring splint for the leg.

The after-care of a patient to whom a non-padded plaster cast has been applied should include frequent observation of the following:

1. The patient should be able to move his fingers or toes voluntarily to a slight extent. If he is unable to do this, it is evident that there is some injury to the nerves, which may be due to trauma at the time the limb was fractured or to swelling in the cast. When this lack of movement is discovered, the cast should be split immediately and further investigation should be made.
2. The patient should have almost normal sensation in the exposed digits. This may be tested by having the examiner touch some finger or toe and having the patient state which one it is. If circulation is impaired, the patient will not be able to do this, and the cast should be cut at once.
3. The most important sign to be looked for is change of color. The portion of the limb exposed below the cast should be well supplied with blood. If there is evidence of cyanosis, the cast should be split immediately.
4. Marked swelling should also be a reason for splitting the cast. A small amount of swelling may be ignored, provided the sensation is normal and the color of the digits is good.
5. If the patient complains of pain, there should be an immediate examination of the limb.

The necrosis of skin described in the second case was probably due to a change of position of the foot, after the plaster had been applied and before the cast had set, which produced wrinkles and caused uneven pressure on the dorsum of the foot. In applying casts of this type, one must be sure that the splint exactly fits the limb. The under surface of the cast should be smooth. It is, therefore, essential that there be no dents from fingers or supports in the plaster, that the bandages be rolled on evenly, and that there be no ravelled edges which would cause constriction after the plaster had set. "Circular plaster bandages should never be applied to the bare skin of cone-shaped extremities such as the leg and forearm; they should always be applied over a plaster splint."[7] It is often advisable to use light padding over bony prominences, even though the main part of the cast is unpadded.

SUMMARY AND CONCLUSIONS

Two cases of accidents due to improper use of the non-padded cast are reported. The dangers of interference with circulation by constriction or by local pressure on the skin are described. It is urged that the non-padded cast be used strictly as a hospital procedure, where the patient may be under the constant surveillance of a trained staff. The non-padded cast is not intended for office use, for home use, or for early fixation of fractures for the purpose of transportation. A cast should be split immediately if there is any question about adequate circulation of blood in the limb.



Fig. 1. Ulcer produced by wrinkled surface of a non-padded plaster cast.

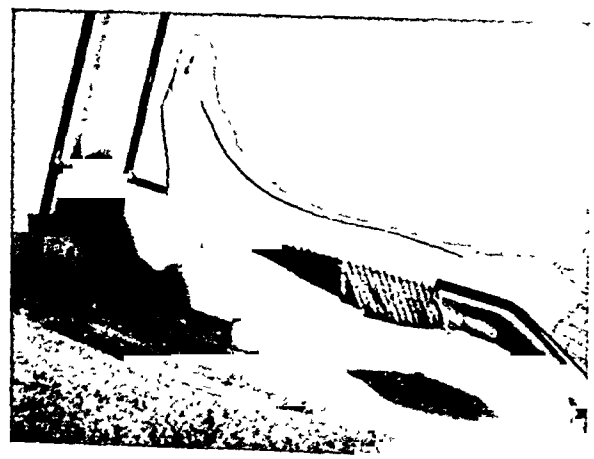


Fig. 2. Non-padded plaster cast elevated on a Braun splint. The cast has been split to insure adequate circulation in the foot.

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Impalement of the Rectum *

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POSSIBLY the first cases of impalement of the rectum reported to have occurred in this vicinity are apocryphal. A somewhat legendary account relates that in about 1850, at Crow Rock, Montana, there was a battle between the Sioux and Crow Indians, apparently brought about through a dispute over the exclusive hunting rights involving the then rich buffalo hunting grounds between the Yellowstone and Missouri rivers. At the finish of the battle, a considerable number of the surviving Crows were made prisoners. They were bound. Ash poles were obtained from a nearby creek, both ends sharpened, and one end firmly impaled into the rectum of each hapless victim who was then hoisted into the air while the other end of the pole was forced into the ground. The victors departed secure in the belief that right had triumphed in a world fraught with injustice.

Injuries of the rectum, including rupture and perforation, occur from widely diverse causes. The traumata of parturition and of attempts at delivery account for many. Gunshot wounds have not infrequently involved the rectum. The introduction of foreign bodies into the rectum, usually as a manifestation of sexual perversion, has been a rather common cause. The writer has personally removed a beer bottle, and a hammer handle, neither of which caused perforation, from two individuals, each of whom apparently inserted the object through perversion.

In a rectum already weakened by ulceration or carcinoma, the injudicious use of a proctoscope has been known to cause perforation. Zengerling reports recovery following a perforation during a proctoscopic examination in a man of 62. He also quotes Menegaux who had in 1933 collected ten cases of perforation of the rectum following proctoscopic examination, of whom five died—a timely warning that even the proctoscope and sigmoidoscope should be used with gentleness, care, and due appreciation of the anatomy of the structures involved. Extensive fracture of the pelvic girdle with marked displacement of fragments can rupture the rectum; but here much more frequently the bladder or urethra suffer injury. Even enema tips have been forced through the rectal wall in numerous instances, during the careless introduction of this object by nurse or patient.

True Impalement Wounds of the rectum are from their very nature major catastrophies. They too have occurred in many ways, probably most frequently in agricultural areas. Goring by bulls, and falls upon both sharp and blunt objects such as corn stalks, stakes, pickets, pitchfork tines and handles, shovel handles, etc., have been noted. Sharp sticks, billiard cues, etc., have caused rupture either by playful or accidental introduction. Falls from hay or grain stacks or loads, or falls from hay lofts, landing upon the upright handle of a pitchfork have been reported, and doubtless many cases have been unreported. The collapse of a broken chair or a chamber vessel have been mentioned as causes in the literature.

*From the Garberson Clinic.

PATHOLOGY

The tortuous course of the rectum as seen during a proctoscopic examination explains readily the frequency of tears or perforations when some blunt or sharp object is rapidly introduced, usually with great force. Dependent upon the course of the perforating object and the depth of its entrance, the wounds may be classified into important groups.

1. Direct impalement occurs through the anal opening. At a higher level the object then pierces or tears the rectum from within outward, usually in its passage tearing through other structures such as prostate, urethra, bladder, peritoneum, coils of small intestine, uterus, ureters, kidneys, liver, or even the diaphragm. Obviously these represent the cases of serious nature, and usually have a high mortality, because of associated injuries and, frequently, the contamination of the peritoneal cavity.

2. Indirect impalement occurs by an object piercing the skin at a varying distance from the anus. Only after traversing a variable distance of perirectal tissue does it enter the rectum from without inward. Here the damage may end or it may continue onward to again leave the opposite rectal wall at an oblique angle, after which its course may be subject to all of the vagaries of Group 1.

The angle of impact and the character of the impaling object, together with the height of the fall or the amount of force expended, all are factors in determining the character and extent of damage. As would be expected from the nature of the injury, most of the patients are males.

AGE

In the case reports available, one is struck with the fact that there are two groups of age incidence: First, the active age of late childhood and adolescence. Here, frequently the attempt to jump a fence or hedge or the playful insertion of a stick or other slender object results in the impalement. Secondly: the adult who is engaged in farm or other labor and is subject to falls such as from stacks, hay lofts, or scaffolding.

SYMPTOMS

Obviously a condition presenting such a variation of possible pathology cannot have clear-cut symptoms. If the object has entered the anus, there may be no local signs, though oftener there is some bruising or tearing evident about the anal opening. In case the piercing object entered via the buttocks, perineum or perianal regions, a skin wound at the point of entrance will be visible. Bleeding may or may not be present, either from the anus or the perianal wound of entrance, although

the rich blood supply of the region predisposes to free hemorrhage, and severe intra-abdominal hemorrhage may be present with little or no external bleeding. This occurred in the case here reported.

Digital examination or the cautious use of the proctoscope may reveal the wound in the rectal wall. Bloody urine may indicate an associated injury to the urinary tract, most often the bladder, or urethra. Severe abdominal pain and rigidity, together with early signs of shock, are strongly indicative of peritoneal involvement and bespeak a guarded prognosis and early abdominal intervention. The absence of these findings, especially in cases with perianal perforation, tend to indicate that the perforation may have been stopped by impingement on the bony pelvis or otherwise limited, in which event local treatment from below, together with administration of antianerobic serum, may be sufficient.

PROGNOSIS

Without peritoneal involvement, the prognosis is usually good, though extensive perirectal tissue destruction may result in a prolonged disability.

With peritoneal involvement, the condition becomes grave and very high rates of mortality are given in the literature. Madelung in 1926 collected 103 cases having associated injury of the peritoneum. Of these 103 cases, 60 died. Probably the true mortality is still higher, for the condition is unusual, and few surgeons have a series of many cases. Doubtless many fatal cases have not been reported.

TREATMENT

Obviously, the first concern is to determine, if possible, whether or not the peritoneal cavity has been entered. If this catastrophe is evident, or even strongly suspected, immediate laporotomy is indicated, with suture or drainage, singly or in combination according to the conditions present. Often hemorrhage and associated contamination of the peritoneal cavity further complicate the problem. Unfortunately, the wound in the rectum usually occurs deep in the pelvis and in an inaccessible location for exposure and suture. In this event, packing and drainage may, of necessity, be used in place of suture of the rectal laceration.

Associated injuries to the bladder, small intestine, or other organs must be searched for and if present, treated according to general surgical principles. Colostomy for the purpose of shortcircuiting the bowel contents during the healing period may be indicated in certain cases.

In case the history and examination afford proof that the impalement has not perforated the peritoneum, local treatment from below may be sufficient. Cleansing and packing of the wound are indicated, though if there be extensive destruction of perianal and rectal tissues, it may be advisable to rest the parts, and spare further contamination by the establishment of a colostomy. In all cases, the possibility of inclusion in the wound of particles of clothing or other foreign matter should be born in mind.

All of these patients should receive a prophylactic dose of mixed anti-anerobic serum, unless this is contraindicated by serum sensitivity.

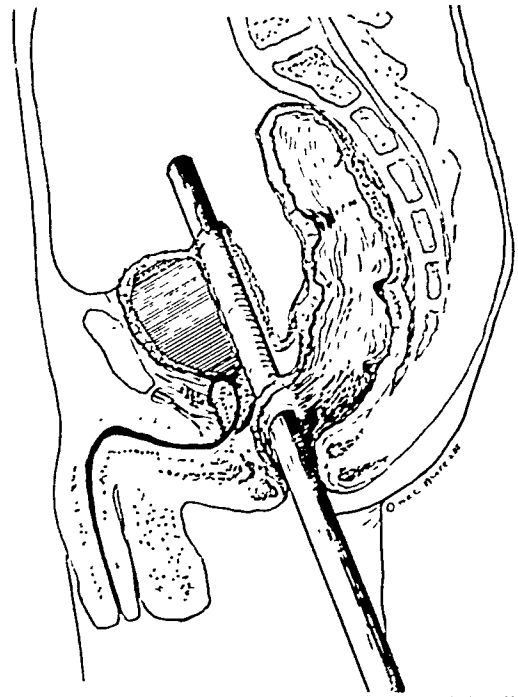


Fig. 1. Sketch showing course of impaling shovel handle in author's case. Man aged 52. Extensive laceration of rectum, prostate, bladder muscularis, and peritoneum. Widespread fecal contamination of peritoneal cavity, and marked abdominal hemorrhage. Recovery.

CASE REPORT

A male rancher, 52, was first seen by me at his home about 65 miles from Miles City on the evening of September 13, 1933. While working in a lignite coal mine that afternoon, he was standing on a shelf of shale, and prizing a heavy rock with a bar. In some manner, his hands or the bar slipped and he fell backward in a semi-squatting position. A straight-handled shovel was sticking upright in the ground behind him but on a level a few feet lower. The handle of the shovel entered the rectum for some distance and was immediately withdrawn. Pain and signs of shock were almost instantaneous. He was placed in a coal truck and transported 12 miles to his home over rough roads. About four hours later, I saw him. At that time, he evidenced severe diffuse abdominal pain and rigidity, his pulse was rapid, he was pale, and he perspired profusely. There were ecchymosis and discoloration about the anus, but no bleeding externally.

A hypodermic of morphine was given and he was transported 65 miles to the Holy Rosary Hospital. On admission, midnight, September 13, 1933, his temperature was 99.6° F., pulse 120, respiration 24, and blood pressure 100/60. Abdominal rigidity was marked and there was evidence of free fluid in the abdomen. He was catheterized and 250 cc. of clear urine was obtained. Microscopic examination of the urine disclosed a few R. B. C. Two hundred cc. of sterile water was slowly injected into the bladder and the same amount withdrawn, thus indicating that the interior of the bladder had not been entered.

A diagnosis of an impaling injury of the rectum with intraperitoneal involvement was made.

The abdomen was opened through a median suprapubic incision. When the peritoneum was opened, several hundred cubic centimeters of blood and thin fecal matter were found widely scattered throughout the abdomen. With suction and sponging, this was removed. The patient was then placed in Trendelenburg's position. Examination of the pelvis disclosed a laceration of the anterior rectal wall low down in the pelvis; the tract involved the space between the rectum and the prostate, a portion of the prostate, the muscularis of the bladder and extending upward and to the right it finally emerged through a jagged

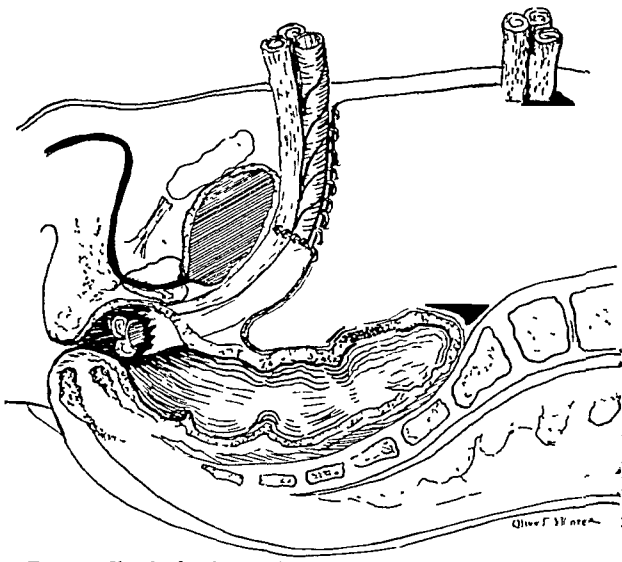


Fig. 2. Sketch showing method employed to extra-peritonealize entire injured area from general peritoneal cavity. Also showing drainage of injured tract and general peritoneal cavity as employed

wound of the vesical peritoneum to the right of the fundus of the bladder. (Fig. 1). Examination of the other intra-abdominal organs was negative.

The location of the laceration in the rectal wall made it inaccessible to exposure and suture, and it was decided to cleanse and pack the tract, and then exclude it from the general peritoneal cavity. In general, the procedure described by Coffey for extraperitonealization of the distal bowel in his two-stage abdomino-perineal resection for cancer of the recto-sigmoid was followed. By infolding the parietal pelvic peritoneum from each side toward the midline and suturing it together there, a tube was formed. The lowermost margins of this tube were securely sutured to the posterior margins of the tear in the bladder peritoneum. This completely isolated the injured area from the general peritoneal cavity forming, in effect, a new peritoneal diaphragm continuous with the uninjured peritoneum posterior to the laceration in the fundus of the bladder peritoneum. (Fig. 2). Sufficient space was provided below this new peritoneal diaphragm for drainage to be inserted between it and the bladder.

On account of the fluid nature of the bowel contents, and the extensive laceration of rectum, prostate, and bladder muscle, it was decided to divert the intestinal stream. A muscle splitting incision was made in the left inguinal region, a loop of sigmoid colon delivered through it, and its mesentery transfixed with a glass tube. A very soft split rubber tube and two strips of acriflavine gauze were introduced through the supravesical region, now extraperitoneal, down to the tear in the rectal wall. The general peritoneal cavity was again sponged out and 50 cc. of amfetin was introduced. Three soft split rubber tubes were inserted at about the middle of the incision which was then closed above and below the drains. A prophylactic dose of mixed tetanus and anerobic gas gangrene antitoxin was administered. The patient was placed in a high Fowler's position, and 2000 cc. of 5 per cent glucose in normal saline solution was given intravenously daily. A retention catheter was inserted.

On the next day, a Paul's tube was inserted in the sigmoid loop.

Convalescence was fairly uneventful but on the eighth postoperative day, there was definite urinary drainage through the suprapubic tract; this continued for 18 days, gradually decreasing, with a corresponding increase in the amount draining through the retention catheter. On November 22nd the colostomy was closed by suturing the opening in the bowel, and burying it extraperitoneally underneath the abdominal muscles.

The patient was discharged from the hospital December 8, 1933. The abdominal wounds were well healed, and the bladder and bowels were functioning normally.

Discussion of Case

No claim for originality is made regarding the formation of the pelvic diaphragm of the peritoneum, but its adaptation to this purpose was original so far as known. It would seem that, in some measure, the absence of signs of peritonitis during convalescence was due to the complete exclusion of the lacerated and potentially infected area from the general peritoneal cavity. Since this technique, with slight modifications, could be used in many lacerations of the rectum with intraperitoneal involvement, even though the laceration occurred through the recto-vesical reflections of the peritoneum, it is deemed worthy of mention. In the minority of impaling injuries, the penetrating object perforates the rectum at a point accessible to accurate suturing. In this event, the peritoneal isolation as described would probably be unnecessary. However, a majority of the impaling wounds of the rectum do perforate and lacerate in a region difficult or impossible of access for suturing.

Summary

1. A brief review is given of the causes of injury to the rectum.

2. Attention is called to the possibility of perforations of the rectum by proctoscope and enema tips.

3. Impalement wounds of the rectum are described and attention called to the wide variety of possible causes.

4. Symptoms and treatment depend primarily upon the presence or absence of perforation of the peritoneal cavity.

5. A case of direct rectal impalement due to fall upon a shovel handle is reported.

6. An original method of treatment adapted from Coffey's method of pelvic drainage and isolation from the general peritoneal cavity is described.

7. Colostomy was employed to divert the intestinal contents during the healing period.

8. The prophylactic use of mixed anti-anerobic serum is noted and advised in all such injuries.

9. In spite of extensive lacerations of rectum, prostate and bladder, and the presence of marked intra-abdominal hemorrhage and fecal contamination, recovery with good bladder and bowel function ensued.

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A Safer Technique in Cholecystectomy

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THE advocate of a definite technique for any surgical procedure immediately lays himself open for criticism, and usually justly so. There is a vast distinction between surgical technique and surgery. Surgery, in the only true definition of the term, must always be based upon anatomical, physiological and pathological findings. Any other definition belittles the surgeon and makes of him a technician. A good surgical technician makes a better surgeon, but a good surgical technician does not make a surgeon. In the present era of American industrial development, there is a marked tendency to the development of medical mechanics who apparently have forgotten their pathology, physiology and, sadly enough, even their anatomy. As a result, any advocation of technique is fraught with danger.

The surgical literature has pointed out in emphatic terms, over many years, the dangers in cholecystectomy, and many articles have appeared designed to warn specifically against injuries to the common and hepatic ducts. Probably we should be frank with ourselves and not look upon injuries to these structures as surgical accidents, but placard them for what they really are—surgical tragedies. It is, of course, true that anomalies are frequent in the anatomy of the bile ducts, but when this has been so frequently and emphatically called to the attention of the surgeon, one should suppose that these injuries would be very rare, or almost completely eradicated. Such is not the case. We are, as surgeons and as human beings, creatures more or less of habit and difficult to change from our accustomed ways. Perhaps we can all remember viewing from the amphitheater the dramatic surgeon who in a few minutes with his left hand, and his back turned to the patient, spectacularly displayed before us a gallbladder, commenting during the process on how many minutes he expended in the procedure. It is to be hoped that the asbestos curtain has irrevocably dropped on this phase of American Surgery and that any surgeon aspiring to stardom in this melodrama be transferred to Hollywood where dramatics will be more in tune than in the surgical amphitheater. In order to protect ourselves from becoming too definitely technicians, it would be wise to vary our surgical procedure even when no different pathologic finding is present.

In the examination of large groups of persons, the examiner is frequently stricken with the number of right rectus incisions for appendectomy. In view of a definitely lower mortality from the use of a McBurney incision, it would appear that many surgeons use a right rectus incision routinely and not as the symptoms, signs and preoperative diagnosis should direct. It can be assumed that the abdominal procedure is likewise carried out routinely. The alert surgeon should have the ability to immediately engage in the surgical procedure which conditions demand.

The work of Graham first emphatically directed the attention of the medical profession to the fact that gallbladder disease was secondary to hepatitis, or at least that a hepatitis always was present in cholecystitis and that cholecystotomy was a palliative procedure. While the judgment of the surgeon might correctly dictate the wisdom of cholecystotomy instead of cholecystectomy, there could be little doubt that he would later advise cholecystectomy for a logical cure of the disease. Too many cholecystotomies turned up later, symptomatically demanding cholecystectomy. Common duct obstructions brought out further complications demanding rational care—drainage by a T-tube. The failure of bile to be discharged into the duodenum led to serious changes in the whole biliary tree and eventually the liver cells themselves. Infection of the stagnant bile in the distended common duct increased the operative hazard not to mention jaundice, glycogen, chlorides changes and numerous other pathological changes of the liver.

At the present time, it can be considered basic in the surgical treatment of gallbladder disease that cholecystectomy is essential, likewise that common duct obstruction must be released and the duct drained. Since it has been conclusively shown that gallbladder disease and hepatitis are complimentary, no surgical procedure should be attempted without due regard for safeguarding of the liver. The most practical aid that can be given the liver is in the form of carbohydrates. Until a practical accurate liver function test is at hand, a 48-hour preoperative régime of a high-carbohydrate diet and glucose intravenously is a crutch to the liver, which will be greatly appreciated by the surgeon postoperatively. It is extremely rare that gallbladder disease demands emergency operative measures and undoubtedly the mortality from cholecystectomy would be appreciably lowered if none but the most extreme were ever viewed in the light of emergency cases.

Three overlapping, but nevertheless distinct eras of gallbladder surgery, have occurred. The first was the initial stage consisting of the choice of the surgeon between drainage or removal of the gallbladder. Little attention was given either the liver or the biliary passages unless a profound demand such as common duct obstruction was present. The second era, through the work of Graham and others, led to a recognition of hepatitis and cholecystotomy as a palliative procedure. The third era, being entered at this time, goes a step farther and demands more thorough common duct exploration. For this we are indebted largely to Lahey who has so admirably pointed out the cause of many cholecystectomy failures as due to overlooked common duct or hepatic duct stones. This era should not be

interpreted as license for wholesale common duct drainage, but careful palpation and aspiration are definite essentials of complete biliary passage surgery.

A review of the anatomy of the gallbladder and (particularly) the biliary passages is periodically essential. It makes little difference whether it is accomplished by reference to tests of anatomy, by cadaver dissection, or application in the surgical amphitheater. The location of the cystic artery, behind the hepatic duct, the bifurcation of the hepatic duct and the ever present possibilities of anomalies should constantly be born in mind. To the normal and the anomalous, add the pathological changes through omental and intestinal adhesion, dilated common and hepatic ducts, choledochus cysts, with double common duct (Swartley and Weeder, *Annals of Surgery,* March, 1935) and variations occasioned by previous operations. All of these conditions make up an uncharted field. Only the bravest dare clamp a structure with the appearance of cystic duct, cut it and dissect the gallbladder upward. There is a wide variation in location of the junction of the cystic duct with the common duct; this union may occur anywhere from within a short distance of the ampulla even up to one of the hepatic ducts. The neck of the gallbladder may be parallel to the common duct and be so covered with membrane that they constitute one structure. The cystic duct also may become encased in a pedicle with the common duct and proceed together visually as a common duct. An enlarged common duct may be so confusing that only with the most careful dissecting can the proper structures be identified. A recent cholecystectomy case presented a cystic duct firmly embedded to the common duct for a distance of four centimeters.

From the volumes which have been written of the variations occurring in biliary passage anatomy, further confused by pathological changes, a plea is entered for a more or less routine procedure for cholecystectomy by downward dissection. This procedure may be slower, and if the cystic artery is not previously clamped, more bloody, but it is felt that these objections are negligible if such a procedure will lessen the number of inadvertent injuries to the common and hepatic ducts.

After the abdomen is opened and the gallbladder brought into the field, the liver may be manually rotated or the falciform ligament clamped and used as a retractor to tip the under surface of the liver to a more unobstructed view. The fundus of the gallbladder is grasped with a rubber covered forcep and traction applied upward. An elliptical incision is made about the grasping forcep through the peritoneal covering of the gallbladder. With small forceps, the peritoneum is grasped and held by an assistant. The initial incision is continued down the inferior surface of the gallbladder and on to the cystic duct. Blunt dissection with small forceps is continued to free the gallbladder from the liver, clamping and cutting any troublesome bleeders. Gauze dissection is not used at any time, as it is difficult to conceive of a more traumatic material unless it be sandpaper! As the dissection proceeds downward, another rubber covered forcep may grasp the gallbladder lower to bring the cystic duct closer in the operative field. The cystic artery should be ligated separately and doubly if desired, but it should be ligated as long as possible so that its ligated end may be finally closed over with peritoneum. As the dissection proceeds downward, the cystic duct becomes a pedicle which isolates itself from surrounding structures or at least serves as a guide to adjacent structures. The junction of the cystic duct with the common duct is clear and distinct, careful dissection along its course should never lead to injuries to adjacent bile ducts. When the junction is clearly in view, the cystic duct is doubly clamped, severed with a cautery and doubly ligated with chromic ligature, the ligature end being retained momentarily as a retractor. If any stones are palpated, or if it is felt that the common duct should be explored, it is done at this time, a complete change of abdominal moist packs being inserted as a quarantine. The exploration of the common duct should consist in vision of its size, palpation for presence of stones and finally aspiration for bile. The presence of murky flocculent bile should justify incision of the duct, for examination and exploration for stones either lower toward the ampulla or in the biliary ducts. If there is no jaundice present, the common duct is of normal size, there are no stones palpable, and the aspiration with the needle reveals clear light colored bile, there is sufficient evidence that further exploration is not necessary. The peritoneal flap resected from the gallbladder and cystic duct is sutured continuously over the stump of the duct and the ligated cystic artery, along the liver bed so that complete peritonealization of the gallbladder area has occurred. The abdomen in the absence of common duct drainage is closed without drainage, the only exception being when the gallbladder has been torn inadvertently, allowing a great deal of soiling with bile.

In common duct drainage, there are several pitfalls to be avoided: first, the incision in the duct need not be larger than to permit the insertion of the folded T-drain, or the removal of stones, and secondly, meticulous attention should be given to the condition of the rubber T-tube itself. It should be thoroughly tested and inspected before insertion to ascertain that the rubber is vital and that no leaks are present. It is quite embarrassing in attempting to remove the drain postoperatively to pull out only the upper portion!

A survey of the causes of common duct injuries and the painstaking, always disheartening task of repair, so admirably presented by Lahey, should be read by every surgeon who does gallbladder surgery. A digest of the unfortunate "accidents" of duct injuries should be a wholesome impetus to safeguard against these ever occurring again. It is with the ease of prevention of injuries, that this plea for a technique which should further guard these passages is presented.

Intravenous Urography as an Aid to Surgery

An Improved Method for Better Visualization of the Upper Urinary Tract

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WITH the development of excretory urography in the field of urologic investigation, numerous articles have become available concerning its value in renal function and in diagnosis of renal and ureteral disease. Several tests of renal function are in common use. Some of these are sufficiently complicated that the average urologist, surgeon, or general practitioner avoids them unless he has a highly trained laboratory technician available. The use of the indigo carmine test by the cystoscopist and the phenolsulphonphthalein test by the clinician give practically the same results as the more complicated tests.

The proper administration intravenously of urographic media also gives a good index of the degree of renal function present in an individual and also may give an excellent outline of the entire upper urinary tract. Therefore, although the latter procedure is decidedly more expensive for the patient, it is especially indicated where questions of diagnosis and operability arise. It is well known that failure to utilize a diagnostic procedure in common use may lead to unnecessary operations. An example is the patient who has had his appendix removed by his local surgeon because of pain caused by a right renal or ureteral calculus. Many chronic kidney diseases may manifest themselves only by gastro-intestinal symptoms and thus mislead the clinician and surgeon.

Diagnostic procedures to rule out the urologic tree as the causative factor in certain pathological abdominal conditions, such as gallbladder disease and peptic ulcer, are sometimes attended with danger, especially if catheterization of the ureters and retrograde urograms are obtained. Patients with decreased renal function or with urinary tract infections often tolerate cystoscopy and retrograde pyelography poorly, and may suffer severe reactions to such procedures. In such cases, intravenous pyelography may give exceptionable information. Dilated kidney pelves or hydro-ureters may be well shown without a concomitant reaction, and enough may be learned from poorly functioning kidneys to warn one against extensive operative procedures on any part of the body.

Excretory urography as a diagnostic procedure seems especially indicated where urinary tract infection is known to exist. Trauma from instrumentation, even though done in the most skilled and gentle manner, is often followed by chills and prostration. Retrograde pyelograms at best are frequently followed by pain and discomfort so that although cystoscopy and pyelography are performed as an office procedure, the patient may then be sent to a hospital for 24 to 48 hours to recuperate. With intravenous urography correctly performed, however, the patient feels as well at the completion of the test as he did before the test was begun, so that even temporary incapacitation is not experienced.

Infection in the lower urinary tract may be carried to the ureter and kidney pelvis by the ureteral catheter. This factor is of considerable importance where tuberculosis may exist in one kidney but not in its partner. Tubercle bacilli may pass from an infected kidney into the bladder and when such urine is voided, and stained specimens show the tubercle bacillus, quite often we do not know which kidney is the offender. Cystoscopy and catheterization of the ureters can only be expected to carry organisms to the kidney not involved. The same holds true for other types of infection. Intravenous urograms frequently give enough information so that further manipulative procedures are unnecessary and the patient is saved considerable discomfort. It is, of course, readily acknowledged that retrograde pyelography is still of importance in the differential diagnosis of a small group of cases where the disease itself may be in doubt or where the lesion is exceedingly small and circumscribed so that it is not shown in an intravenous urogram. The fact remains however that the latter is the procedure of choice primarily.

These facts are generally known and appreciated by the medical profession. During the first few years after the introduction of excretory urography, the procedure was widely used. Of late, however, it seems to be the prevalent opinion that intravenous pyelography is not entirely reliable and that although it gives a good index of renal function, roentgenologic visualization is often so poor that the test is of little value. One is impressed that the latter may be true after viewing some of our colleagues' films. Such films often show poorly outlined kidneys with fragmentary visualization of the calyces and a partially filled kidney pelvis. The ureter may be visualized in only its upper or lower thirds and sometimes may not be apparent at all. Such films, while quite unsatisfactory, have their chief value in giving an estimate of the degree of renal function. By studying all the films made at the various time intervals, however, information may be pieced together to be of considerable value. Films made five or ten minutes after intravenous injection may show beginning concentration of the media in the calyces, indicating good renal function. A dense shadow of a considerable amount of the media in the bladder area shown in the early X-ray films is also evidence of good renal function, especially in those cases where very little of the media is apparent in kidneys. That really good visualization of the upper urinary tract depends upon the amount of media present there, seems

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apparent. With this thought in mind, an attempt has been made to keep as much of the media in the kidney pelvis and ureter as possible during the time interval that the first two or three films are taken. The large rubber abdominal bag used routinely in X-ray laboratories seems of little value for this and we have discarded it. Instead, firm pressure is made directly over the pelvic brim at the point where the ureters cross the bony pelvis. At the completion of the first film, after injection of the urographic media, one can usually determine the number of further films required. As soon as good visualization is obtained, the abdominal pressure is suddenly released and a film exposed during the next few seconds. The media which has been "dammed back" courses through the ureter and thus a complete visualization of the kidneys and ureters is obtained.

METHOD

The following technique has been followed during the past four years in this clinic and it is now the unusual case that does not show good roentgenologic visualization of the upper urinary tract.

If possible, the patient is instructed 24 hours previously to take a cathartic to eliminate gas and fecal material from the colon. Castor oil is most effective; if patients dislike this too much, milder cathartics may be used. A preliminary X-ray exposure of the kidneys, ureters and bladder is made for comparison with later films. If gas in the colon obscures a portion of the urinary tract, the patient is given a cleansing enema followed by pituitrin intramuscularly. Recently prostigmine has been substituted for pituitrin.

The arm band of a blood pressure machine (either mercury or spring sphygmomanometer) is folded snugly upon itself so that a rectangle 7 by 5½ inches is formed. With the patient lying straight upon the X-ray table, this folded arm band is laid crosswise on the abdominal wall so that the inferior border reaches to the pubic bone. The compression band of the X-ray machine is brought snugly across the blood pressure arm cuff and the urographic media given intravenously. Immediately thereafter, pressure in the arm band of the sphygmomanometer is raised to from 70 to 110 millimeters of mercury. This pressure varies in intensity with the body build of the patient, but is maintained for 15 to 20 minutes. About 70 millimeters of mercury pressure is sufficient for builds of the asthenic type while 90 millimeters is used for sthenic types. From 90 to 110 millimeters of mercury pressure is usually required for obese or hypersthenic types. Such pressure is enough to obstruct the ureters as they cross the brim of the bony pelvis and allows the urographic media to collect in the kidney pelves and upper portions of the ureters. The first X-ray film is exposed 5 to 10 minutes after completion of injection of the urographic media intravenously. This film is immediately developed and examined while wet. Usually good visualization of the kidneys and upper ureters is apparent so that further films may be taken and the lower abdominal pressure released. If this is true, another film is taken (about 15 minutes after injection of urographic media) with the pressure bag in place. Immediately thereafter, preparation is made for another X-ray and the pressure in the blood pressure arm band suddenly released and the arm band removed. Within 3 seconds after removal of the pressure, the X-ray is taken. The patient continues to lie quietly while these films are developed. Four films, including the K. U. B., are taken.

The first film (K. U. B.) shows kidney outlines and often questionable shadows such as calculi. The second film, taken 5 to 10 minutes after injection of the urographic media, with the pressure bag in place, gives an estimate of the appearance time of the media and clearly outlines the periphery of the kidneys. Often the kidney pelves and calyces are clearly defined. The third film, taken about 15 to 20 minutes after injection of the urographic media, gives a more dense kidney outline and a sufficient amount of the media will be present to give good outlines of the kidney pelves, calyces and upper two-thirds of the ureters. The fourth film, taken immediately after the pressure bag is released, shows the outline of the lower thirds of the ureters.

If good visualization is not present when the second film is examined, pressure is maintained and another film exposed at the end of 20 minutes. This also is immediately developed and viewed while wet. If function is at least fairly adequate, this film should show good kidney outlines, calyces, pelves, etc. The above procedure is then continued. Further films may be taken as the case may indicate, to show stasis or for use as cystograms.

SUMMARY

The value of intravenous urography as a test for kidney function and as a surgical diagnostic aid is generally well known among the medical profession. Of late, however, it seems to be the prevalent opinion that intravenous urography is not entirely reliable and that roentgenologic visualization is often so poor that the test is of questionable value. If such visualization is poor, it often is the result of insufficient filling of the kidney pelves and ureters with urographic media. Therefore, an easy method to overcome this weakness in the test is discussed in detail.

With such a technique, four 14x17 films are exposed for the usual adult patient. The discomfort of the procedure is only slight and there are no residual ill effects. The procedure gives excellent information regarding kidney function. As a rule, the filling of the ureters and kidney pelves with urographic media is as satisfactory as in retrograde pyelograms or uretero-pyelograms without causing the spasm which so often results from the latter. Discomfort to the patient is not great and he feels as well at the completion of the test as he did at the beginning.

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Postgraduate Surgical Study in Edinburgh

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MANY American doctors have studied in European medical centres, but relatively few have spent much time in Edinburgh. Because of the current political turmoil in central Europe, it is unlikely that Vienna and other centres will be very popular for some time to come, and Americans wishing to study abroad will look elsewhere for instruction. I recently spent a few months studying in Edinburgh, and it has been suggested to me that a short account of the opportunities for surgical study there might be of interest. Of course, one need not leave this country to secure any form of education but it at least makes an excellent excuse to travel. The benefits to be derived will depend a great deal on the attitude of the student. He may develop a broad tolerance for other nation's ideas and customs or he may judge them by comparison with the way similar things are done at home. Too much of the latter attitude will send him back disappointed. I am afraid that some of this comparison has crept into this article, chauvinism being a hard thing to conquer.

In Great Britain, those who wish to practice as surgeons or enter one of the surgical specialties, almost invariably qualify by passing an examination for a higher degree. In the main they take the examination for admission to the Royal College of Surgeons of England or Edinburgh. The English examination is conducted in two parts, a pre-clinical and a clinical, and is considered more difficult than the other. At Edinburgh, the entire examination is taken at one time and is a written and oral test in surgery, anatomy and embryology, surgical pathology and operative surgery. Examinations are held quarterly and the number of candidates average around one hundred, of whom approximately thirty per cent get through each session. The standards are quite high and to pass, any candidate has to completely satisfy all the examiners whom he happens to meet. It seems to me that the British system of higher degrees of which there are a great many, the M.R.C.P. for internists, the M.C.O.G. for obstetricians and gynecologists, D.L.O. for otolaryngologists, etc., is very similar to our system of special boards. They serve the same function of certifying as to the competency of the candidate. Naturally there is no certain way of appraising the actual practical ability of the individual which is an inherent defect in any examination system.

Edinburgh has been a centre of learning for many years and at any given time there will be approximately two hundred graduates who are studying surgery. Americans are rarely found in this group, most of the students being British, a large percentage being from the various British dominions, colonies and dependencies. There are Australians, New Zealanders, Canadians, South Africans, Indians, occasional African Negroes and Chinese as well as English, Irish, Welsh and Scots. Let it be said here that there is no opportunity for the surgeon to secure practical work there. The instruction available is entirely didactic with an opportunity to attend clinics. The custom is for the student to spend some time on theory in Edinburgh and some time as a house officer or resident surgeon in hospitals throughout the British Isles. Here they have an opportunity to do considerable work. The practical training in the British hospitals is usually very good. Such positions would not ordinarily be available to a non-Britisher, or to one who is not licensed by the general medical board. While in Edinburgh, students are engaged chiefly in studying for the examination for admission to Fellowship in the Royal College of Surgeons. There are no formal studies required for admission to the examination and the candidate may secure his instruction in any way which happens to suit him. Actually most of the instruction is given by various tutors. Each tutor gives a series of lectures in his subject and arrangements can be made for private instruction if desired. Such courses are, at present, not in any way connected with the medical schools and it is completely a matter between the student and tutor. With few exceptions the tutors are very capable men able to present their subject clearly and in great detail. A surgeon giving lectures on surgery will also dwell on pathology, embryology and anatomy. Classes are held wherever the tutor (who pays the rents) can find accommodations. The hardiness of the Scots is as well known as their frugality so one finds classes being conducted in the most barn-like halls. In the winter the less hardy students will be wearing overcoats and mufflers. One such place known as Temperance Hall was particularly unprepossessing. Temperance Hall belongs to the local total abstinence society which, judging from my observations, is a distinctly unpopular and poorly patronized fraternity. To reach the hall one ascended a narrow winding concrete stairway decorated at few intervals by broken panes of glass. The equipment consisted of a few hard benches, a temperamental black board and one of the most unique and futile heating systems it has ever been my sorrow to meet. This consisted of a small gas jet with a tiny boiler which theoretically warmed an ordinary steam radiator. Of course, the fire was only lit when the class began and was extinguished immediately on the close.

Apart from the absence of creature comforts, tutors make every effort to give good courses and by and large they are good. That is to say if one wishes to thoroughly cover the subject of surgery, including orthopedics, anatomy and related pathology he will do so in considerable detail in an amazingly short time. As students are studying to take the examination for Fellowship in the Royal College of Surgeons of Edinburgh, the courses are, in essence, cram courses for them to bone up the required knowledge. Students also spend some time in the pathological museum of the Royal College of Surgeons. The

museum is well housed and the various specimens displayed so that they are quite accessible. One may learn a great deal of gross pathology in this museum, which is essential for the examination.

Clinical teaching is carried on in the Royal Infirmary, where the University of Edinburgh provides, for a small fee, a series of daily clinics. Students are also required to secure hospital tickets which entitles them to the privilege of visiting the operating rooms and wards. The leading surgeons of Edinburgh are in attendance and devote a great deal of time to teaching, much of it being undergraduate instruction. Sir John Fraser conducts a weekly undergraduate clinic where he goes over cases with students. His clinics are instructive and always well attended. Upwards of two hundred people crowd the amphitheatre so that standing room is at a premium. The hospital is always full and the surgeons are usually able to present large series of cases of unusual conditions. They may also arrange for a number of outpatients or old patients to be present. Some of these people will have been under observation for many years, perhaps all their lives, so one is able to observe the course of a disease and the results of various methods of treatment. Such material, ably presented, makes the time spent there well worth while. The Royal Infirmary of Edinburgh has the distinction of being the first of the voluntary hospitals in the British Isles and during its long existence many distinguished men have worked there. The present surgeons are justly proud of their heritage although veneration of the old is carried rather farther than seems necessary. In this respect, the physical equipment of the hospital could be much improved by a radical modernization operation. Doubtless, lack of sufficient money explains why many needed improvements have not been made, but certainly the love of things as they are, or as they were, is a factor to be reckoned with. Nevertheless, it is a noble pile of stone and much good work is being done within its walls.

Other hospitals in and about Edinburgh are not so highly organized for teaching purposes but are well worth a visit. In particular, the Royal Hospital for Sick Children in Sciennes Road has a large surgical service under Mr. Wilson and Miss Hershberger. The Princess Margaret Rose Orthopedic hospital in charge of Mr. Cochrane is most interesting for several different reasons. It is a voluntary hospital supported, in part, by subscription but also by various local government units who pay a per diem sum for each patient. It is the centre of an organization for the care of orthopedic defects in children with a most admirable administrative setup. They conduct a clinic at the hospital and control numerous subsidiary clinics in surrounding local communities. These clinics are a permanent organization consisting of a local doctor, public health nurse and in most cases a trained physiotherapist. Orthopedic surgeons visit the outlying clinics on occasion. Thus they have complete control of the cases which are sent in for care and of those cared for locally as well as the follow-up and after-care. The hospital itself is a very modern institution with swimming pool and all facilities for physiotherapy. The institution is located on a hill outside of the city where the air is keen and bracing. To ensure that the youngsters get plenty of air, all the wards are completely open at one end, with no way whatever of shutting out the breezes. The ward looks very fine but the blue noses and ears of the patients and hands of the nurses do not. In this connection, I recall making rounds in the children's ward of another hospital where one of the patients was so blue that it was supposed that he was receiving sulfanilamide. Incidentally, the matron or head nurse very much resented any insinuation that it might be just a trifle chilly.

The Panel system of practice in Great Britain has had a profound influence on hospitals and medical care in general so that a short discussion of it might not be out of place in this article. Much has been written both pro and con about this scheme and I suppose a great deal depends upon the point of view with which one approaches the subject. I do not pretend to any profound knowledge of such a controversial question but I gained certain impressions from various people whom I met. I think most people are more or less familiar with the general idea of the panel setup, though some of the more rabid enthusiasts seem to have little understanding of it as they talk of it as a system which provides complete medical care. Actually all the scheme sets out to do is to supply general practitioner service in the office or home to a specified group of low income wage earners. Each panel practitioner has a list of persons not exceeding 2500 to whom he supplies this service. For this, he receives from the insurance fund a capitation fee, of about $2.25 per year for each name on his list. The advantages of the plan to the practitioner, who may also have a private practice, are that he is paid for caring for a group of people who would otherwise receive free care; that his income is stable and predictable and that he has something worth while to sell if he wishes to dispose of his practice. The insured individual has the advantage of medical care whenever required, without thought of the expense involved, from a doctor of his own choosing. The plan is open to the following criticisms:

1. The doctor with a large panel cannot spend much time with each patient. The practice of prescribing with little or no examination is said to be very common.
2. Also, of course, he is bound to have a lot of time used up in seeing people with trivial complaints, filling out papers and dealing with malingering. This, of course, is bad for both doctor and patient.
3. A serious defect is the fact that the families of insured persons are not included. They are cared for by the doctor on a private fee basis and if the head of the family would have difficulty in paying for medical care for himself it seems doubtful that he would be able to pay for that given his family.
4. From our point of view the panel system is undesirable because of the lack of provision for specialist and hospital care. These must be provided by

the voluntary hospitals, supported by donations. They are completely unable to keep up with the demand for services and are unable to secure sufficient funds for expansion. Invariably a voluntary hospital will have a long waiting list. Beds are always full and non-emergency cases may have to wait a year or more before a bed is available for them. The voluntary hospitals care for most of the surgery in panel patients, either as in- or out-patients. Most panel practitioners do not treat any fractures, incise abscesses or do any surgery whatsoever; they simply refer the patient to the out-patient service of the hospital. The hospitals are staffed by honorary (non-salaried) attending men and by residents and interns. Much of the work is done by residents and interns who have an opportunity to get a lot of practical experience during their service.

Resident surgical officers tend to be rather critical of their practitioner brethren and among them one finds some of the most caustic critics of the system.

A fundamental consideration often forgotten in any scheme of medical care is the sort of people with whom one is going to deal. There is a wide difference in the attitude of the British people so aptly dubbed by Margaret Halsey the "ungentry", and the same class of people here. Erwin Edman speaks of "The good natured endurance of the English underprivileged," and "The cynical good nature of the Cockney temperament." In other words, these people have put up with their lot without complaint, do not expect it to be greatly improved and are content to go along making the best of it. It seems hardly necessary to point out that this is not a prevalent attitude among American patients either privileged or underprivileged. In summary one may say that the British Health Insurance plan fulfills precisely the purpose for which it was planned. The plan provides general practitioner service in the office or home, and anyone who may laud it as a complete medical service shows a woeful lack of knowledge of present-day requirements for good medical care.

As I have mentioned, actual conditions of study requires the endurance of a certain amount of physical discomfort. Likewise, living conditions as a whole leave much to be desired. Disapproval may just as well be kept to oneself; no amount of verbal effort will result in any change. Rabelais' injunction, "to spare your breath to cool your porridge," is well worth remembering whenever one becomes filled with a missionary zeal to show people the error of their ways. The real difficulty is that during the winter there is no practical attempt made to supply that external warmth to which we are so accustomed. The British have a peculiar conception of warmth. With them it is largely a visual phenomenon, sensations of warmth not, apparently, being perceived through the integument. Thus, so long as they can see a flame they are warm. The attempt to heat a large room by a tiny open fireplace can only be described as ludicrous and to attempt to explain the virtues, economies and comforts of the modern furnace only makes the explainer appear ludicrous to them. At a hotel, which boasted a hot water heating system, just new, I endeavored to demonstrate the proper method of getting some heat out of the radiators. My plan was of the simplest, merely that some sort of a fire more than a mere candle flame be kept under the boiler. I succeeded only in getting my ears beaten back, politely but definitely.

Much has been written of English food, mostly derogatory. Let me say here that it is quite possible to sustain life on English food, and as the human race is very adaptable, to become accustomed to it. Margaret Halsey, in her witty book, *With Malice Towards Some,* well describes it when she says, "I have never been able to understand how they pried it up long enough to get a plate under it." She also puts forward the hypothesis that in every English hotel there is a corps of "blower offers" who work on the food as it passes from kitchen to table. Certainly they must work a double shift in the mornings and concentrate on the toast. Actually, there as elsewhere, while the average family or restaurant diet may not be very appealing, there are plenty of places where one finds excellent food (and drink).

Edinburgh is a lovely old city with a rather distressing similarity of architecture, all the buildings being of the same type of stone. There are many historical places of interest including the Castle and Holyrood Palace. Standing as it does on the summit of a rocky peak overlooking the main business district on Princess street, the Edinburgh Castle is an imposing spectacle, especially on the rare nights when it is illuminated by flood lamps. The overhanging pall of smoke which has earned the city the name of "Auld Reekie" and the numerous foggy rainy days give the winter visitor a poor impression. In fact, all British cities have a rather gloomy appearance, but the beauty of the countryside more than compensates for this. In the district surrounding Edinburgh there are innumerable places of scenic or historical interest which anyone will enjoy visiting. There are the beautiful Trossachs, Loch Lomond and many another Loch, the heather-covered hills, the gild gorse with its showy yellow flower, ruins of old abbeys such as Dryburgh and Jedburgh, the bleak and desolate Lammermoor and many another. The great literary heroes of Edinburgh are Walter Scott, Robert Burns and Robert Louis Stevenson and one is frequently reminded of them and their writings. One has only to recall the many beautiful places visited, especially in the South of England, to say with Cowper, "England with all thy faults I love thee still."

Ectopic Pregnancy*

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ECTOPIC pregnancy is the abnormal implantation of a fetus outside the uterus. The importance of early recognition and treatment is essential in order to maintain a low mortality. Ectopic pregnancy presenting the classical symptoms may be difficult to diagnose, but many cases show atypical signs and symptoms which are confusing and the diagnosis is missed. I have reviewed 166 of our own cases, the analysis of which is the basis of this presentation. Anatomically, the location of ectopic pregnancy is in the ampulla, the isthmus or the interstitial portion of the tube, and in rare instances in the ovary and abdominal cavity. Two of the total number of cases reported were in unmarried women. One was diagnosed acute appendicitis and the other was readily recognized, in spite of the fact that the patient was too sick to give a coherent history; in the latter case, however, all the classical symptoms were present. This is just a reminder that one must not be influenced by the social status of the patient.

Tubal pregnancy is thought by some to be due to some interference with the passage of the ovum from the fimbriated end of the tube to the uterine cavity. The most commonly accepted cause is pelvic inflammatory disease following venereal infections, abortions and normal deliveries. In the series, only one definite history of gonorrhea was reported, so this "socialite" can be dismissed as a causative factor. There was one abortion in 29 patients; two in eight; and three abortions in two. The remainder gave no history of miscarriage or postpuerperal complications. Other causative factors are adhesions, presence of pelvic tumors and tubal diverticulum. The operative findings in the 166 cases do not clearly reveal any definite pelvic abnormality. However, one patient had a fibromyoma and in 26 cases ovarian cyst of varying size was present, which may have been the cause of the angulation of the tube, thereby delaying the movement of the ovum. From these findings I do not believe that one could positively state that the causative factors have been determined.

The following brief case history will illustrate the questionable causative factors.

On June 15, 1936, at 12:30 A. M., the patient became ill with pain and spotting which lasted one day. Menstruation was overdue one week. During the night she developed more severe pain in her lower abdomen, especially in the left lower quadrant. The pain was intermittent in character. Examination showed a well developed, overnourished woman in pain simulating that of labor. Temperature was 98.6°, pulse 70. Lungs and heart were normal. Abdominal examination revealed a marked tenderness in left lower quadrant with some resistance. There was some pain in the right lower quadrant. Deep pressure referred the pain to the left lower quadrant. A diagnosis of ectopic pregnancy was made. She was sent to the hospital and was operated on that morning.

The surgical findings were that of a right tubal abortion with a hemorrhagic cyst in the right side. The peritoneal cavity contained free blood. Both tubes were apparently normal except for bleeding about the right ovarian cyst which was five centimeters in diameter. A right ovariectomy was performed and the abdomen closed.

The patient made an uneventful recovery until December 28 when she again developed pain in the abdomen, more on the right side, with spotting. Temperature was 100°, and pulse rate 100. The patient was uncomfortable on account of lower abdominal pain. Manipulation of the cervix produced severe pain. A diagnosis of ectopic pregnancy was made. However, in view of the fact that her symptoms were comparatively mild and she had had a tubal abortion before, we were under the impression that a similar condition existed and that we should procrastinate. The leucocyte count varied between 8,000 and 16,000. One week following her original examination, she had a definite mass in her right lower abdomen. She was again operated on and at this time there was a ruptured tube on the right side at the isthmus. A right salpingectomy was performed and the patient made a very satisfactory postoperative recovery.

The question arises in this case as to the etiological factor. The patient had, of course, had a period of sterility following which she had two abnormal implantations of an impregnated ovum. The first time it apparently was only a tubal abortion and the attending surgeon definitely stated, from his exploration, that there was no inflammatory process present. Both tubes were left *in situ*. Within a period of six months she again became pregnant in the same tube in which she had had a tubal abortion, without showing any malformation or any infectious process on the opposite side.

From this case, one readily sees that the etiological factors are still in question. However, the patient's general appearance and overweight showed that she had an endocrine disturbance and led one to suspect that there was an ovarian functional disorder which readily could have caused her unfortunate disturbance.

Ten patients, or six per cent of the cases, had two ectopic pregnancies, of which two never had had any previous pregnancy and two had had abortions previous to their tubal pregnancy. All the others had had previous pregnancies and also had pregnancies following their first ectopic one. In these cases, the pathological report gave no evidence of previous inflammatory process. Perhaps hormonal disturbances could be considered an etiological factor. It has been said that an unusually long period of sterility often precedes an ectopic pregnancy. This is true in some cases. However, it would appear from the following that primary sterility is not the rule. Previous total sterility was found in 35 cases. The largest number were in the one child sterility group for a period of years preceding the ectopic pregnancy. The number of pregnancies varied from one to fifteen. The greatest number of ectopic pregnancies were in the one and two pregnancy types. The age range was from 17 to 47 years, the average being 29½ years. The majority were between 21 and 30 years and 63 occurred between the ages of 31 and 40.

There is perhaps no acute abdominal lesion in which the clinical history is of so much value in making the

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diagnosis as in ectopic pregnancy. The severe, tearing pain in the affected side with fainting and dizziness is the classical sign of the so-called acute ectopic pregnancy. However, there are no absolutely set signs and symptoms which are arranged so as to make an inevitable diagnosis of ectopic pregnancy. Pain is the most constant symptom. It is variable depending entirely on the amount of bleeding that has taken place and the more bleeding intraperitoneally the more pain. Pain was a constant factor in all of the 166 cases. The reflex, or shoulder pain from subdiaphragmatic irritation due to the free blood in the peritoneal cavity was recorded in 30 cases. Vaginal bleeding, another early and important symptom, was recorded in 136 patients in this series. The bleeding varied in amount and regularity. The characteristic bloody discharge is usually dark and occurs sometime after the normal menstrual period. The patient often remarks about the unusual character of the flow; it is unlike hemorrhage in color and quantity, and not excessive like that of an abortion. Ectopic gestation should always be suspected when there is a history of vaginal bleeding following delayed or missed menstrual period, especially when preceded or occurring with pain.

TABLE 1
Age Incidence

Youngest	17	years
Oldest	47	years
Average age	29½	years
17 to 20 years	6	
21 to 30 years	91	
31 to 40 years	63	
41 to 47 years	6	

TABLE 2
Location of Pregnancy

Right side	91
Left side	74
1 in left horn of bicornate uterus, perforated	

TABLE 3
Number of Previous Pregnancies

0 pregnancy	38
1 pregnancy	32
2 pregnancies	30
3 pregnancies	18
4 pregnancies	18
5 pregnancies	9
6 pregnancies	3
7 pregnancies	2
8 pregnancies	1
10 pregnancies	3
11 pregnancies	1
15 pregnancies	1
Unknown	10

TABLE 4
Symptoms

Pain abdominal	165
Pain shoulder	30
Dizziness and fainting	33
Nausea and vomiting	49
Vaginal bleeding	136
Nausea (no vomiting)	16
(1 case had no history of illness given)	

TABLE 5
Blood Picture

Hemoglobin		Red Count		Leucocytosis		Blood Pressure	
Percent	No of Cases	Count in Millions	No of Cases	Count in Thousands	No of Cases	Blood Pressure	No of Cases
21–30	1	1 5–2 0	1	5– 6	3	45/38	2
31–40	5	2 0–2 5	3	6– 7	9	60/45	1
41–50	3	2 5–3 0	10	7– 8	13	70/50	3
51–60	14	3 0–3 5	11	8– 9	11	95/60	4
61–70	22	3 5–4 0	15	9–10	12	100/70	7
71–80	12	4 0–4 5	8	10–11	6	110/80	9
81–90	7	4 5–5 0	1	11–12	8	120/80	5
		5 0–5 5	2	12–13	9	125/90	4
				13–14	5	135/68	3
				14–15	5	150/100	3
				15–16	2		
				16–17	8		
				17–18	5		
				18–19	4		
				19–20	3		
				21–22	2		
				22–23	1		
				23–24	1		
				24–25	3		
				25–26	1		
				27–28	1		
				40–	1		

Thirty-three patients complained of dizziness and fainting. Forty-nine had nausea and vomiting, perhaps due to the peritoneal shock, and 16 had nausea only. The early signs of pregnancy, such as morning sickness, did not occur. The nausea and vomiting usually followed the acute attack of pain. In most of the cases where there was profuse intraperitoneal hemorrhage the pallor of the patient was out of proportion to the hemoglobin reading and the red cell count. The hemoglobin usually drops after the patient has had more than one intra-abdominal hemorrhage. The degree of shock is usually out of proportion to the amount of blood loss. The blood pressure reading is of importance only when the pressure is known before this surgical accident, but in our recorded cases the systolic pressure was persistently low and in only one case was the blood pressure unobtainable. Cullen's sign, a bluish discoloration about the umbilicus, was not mentioned in any of this series. It is an inconstant sign, found only where there has been a large intra-abdominal hemorrhage.

Ninety-one of the ectopic gestations occurred in the right Fallopian tube and seventy-four in the left. This is, perhaps, of no special significance, but the differential diagnosis is more difficult when the pregnancy is present on the right side. The laboratory data showed the red count to vary little from the normal. The leucocyte count varied from 5,000 to 40,000, the majority being between 8,000 and 10,000. The leucocyte count is of some value in the differential diagnosis of pelvic inflammatory disease. It is advisable to make counts early and repeat them a number of times in order that they may be of most diagnostic value. A sedimentation rate has not been performed uniformly, but many cases in this series are before the advent of this test. It is of value early in aiding in the differential diagnosis between ectopic gestation and acute inflammatory disease, but it must be remembered that after the third month of pregnancy the sedimentation time may become rapid.

Vaginal examination should be done with the greatest gentleness and with very little manipulation. This examination revealed marked tenderness in 47 patients and a tender mass in the posterior culdesac in 92. Twenty-five gave only questionable information. Many cases showed marked tenderness upon motion of the cervix.

Ectopic pregnancy must be differentiated from acute appendicitis, threatened or incomplete abortion, acute salpingitis, normal pregnancy, ovarian cyst with twisted pedicle, and hemorrhage of the ovary.

Every case of ectopic pregnancy requires immediate surgical intervention as soon as the diagnosis has been

made. Morphine should be given for relief of pain preoperatively. Intravenous medication may be given while the surgical team is preparing for the operative treatment. Usually by that time the patient has recovered from her first shock. Surgery should be done through the abdominal route and the ruptured tube removed. In this series all had a salpingectomy and in addition 132 had curettage. Nineteen had no curettage. There was no pathological report in 100 and decidua was reported in 28, while five showed normal endometrium. Transfusions are beneficial and in this series ten cases were given such treatment. Eight patients had one transfusion, one had two, and one had five transfusions.

Three of the patients had postoperative infection, one an abscess in the abdominal wall and two had pelvic abscesses which had to be drained through the posterior culdesac. There were three deaths, a mortality of 1.8 per cent. One patient died shortly after operation, apparently from circulatory failure. One died from ileus and peritonitis and one from intestinal obstruction.

CONCLUSIONS

1. The etiology of ectopic pregnancy is still in question.
2. Pelvic pain and bleeding are the most constant symptoms.
3. Most common vaginal finding is pelvic tenderness and tenderness on motion of the cervix.
4. No pathognomonic sign is present.
5. Complete and accurate history is most valuable.
6. Laboratory data aids in the differential diagnosis.
7. Surgery is the only method of treatment.

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Penetrating Foreign Body Wounds of the Knee Joint

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THE treatment of infected wounds of the knee joint, especially relative to drainage, was outlined forty years ago by W. S. Halsted[1] of Baltimore. In discussing a paper at the American Surgical Association in 1898, he made the following statement: "I cannot endorse the views as to drainage of the knee joint. We rarely put drains of any kind into knee joints even though they are infected. A drain can relieve tension but it cannot dispose of all the organisms of an infected joint; the tissues have to take care of these in a large measure and they can do this better without a drain than with it. A drain produces invariably some necrosis of the tissues with which it comes in contact and enfeebles the power of resistance of these tissues toward organisms, but given necrotic tissue plus infection a drain becomes almost indispensable."

The above opinion which was based upon years of scientific observation and study is today generally accepted as correct by most surgeons. While it is always a temptation to place a drain into an infected cavity, the lessons learned during the World War in caring for large numbers of infected knee joints reëmphasized the wisdom and sound judgment of Halsted's statement.

In 1916 Willems[2] of Belgium recommended that drainage of knee joints be instituted by long bilateral parapatellar incisions followed at once by active motion. He was particularly opposed to the use of any drains placed in the joint cavity and to any form of immobilization.

While the insertion of drains down to but not entering the joint cavity has been universally accepted, the question as to whether immobilization or mobilization of the joint should follow arthrotomy is still a subject of controversy. Those who consider the control of infection paramount, advise rest by immobilization of the joint in an extended position plus light traction, while those who believe restoration of function most important, favor early active motion of the joint. Each method has its own advocates and opinion is still divided as to which is the more effective. A brief survey of the literature[3] demonstrates that, generally speaking, European surgeons appear to favor active motion as a postoperative measure, while American surgeons are inclined to prefer rest by immobilization of the joint and traction in a splint.

The sole purpose of the following case report is to call attention to the fact that all forms of drains placed into the knee joint should be avoided, and that satisfactory final results can be accomplished in certain types of infected knee joints by employing active motion following arthrotomy.

CASE REPORT

A healthy and well nourished woman of 27 years slipped and fell in a hay loft striking her left knee against the floor.



Fig. 1. Lateral view of knee showing position of broken nail in the knee joint. The shadow marked with an arrow is a lead marker placed over the small entrance wound



Fig. 2. Anterior-posterior view of knee showing position of nail and also site of entrance wound marked with an arrow.

The resulting wound seemed very trivial; it did not bleed very much and was considered hardly serious enough to necessitate medical attention. She consulted Dr. J. A. D. Engesather of Brocket, North Dakota, a few hours following the accident. A small punctured wound just below and lateral to the patella was cleaned and dressed and a prophylactic dose of antitetanic serum was administered. The following day considerable swelling had developed and it was very difficult for her to stand on her leg because of pain. Forty-eight hours following the accident, because of the increasing severity of the symptoms and findings, her physician X-rayed the knee and a large broken nail was found to be within the knee joint cavity.

On admission to the Grafton Hospital the same day, her temperature was 102° and she appeared sick and in pain. The left knee joint was distended with fluid and very tender on palpation especially over the lateral aspect of the joint. A single punctured wound was present anteriorly at the lower level of the patella Attempted motion of the joint was painful. X-ray films of the knee demonstrated a large broken nail lying within the joint cavity and to the lateral side. The suprapatellar pouch was aspirated with a large needle and a cloudy hemorrhagic fluid was obtained. Under spinal anesthesia, a longitudinal parapatellar incision four inches long was made on the lateral surface of the joint. Special care was taken not to cut into the muscles of the thigh. The joint was opened and a large amount of cloudy hemorrhagic fluid was released. A foreign body (about one-third of a rusty nail including the head) was removed and the interior of the joint was irrigated with warm normal saline solution, a small piece of detached cartilage being washed out. No drains were introduced into the joint but the wound in the soft tissues was held apart by vaselin gauze. (Usually even drains in the soft tissues are not necessary if long incisions are employed.) No immobilization was carried out, and following the operation, the patient was encouraged to flex her knee daily as much as possible.

Her convalescence was uneventful. The swelling and tenderness in the joint rapidly subsided, the temperature remained around 102° for three days and then gradually decreased; drainage from the joint was not excessive except the first two days. The gauze pack in the soft tissues was removed on the fourth postoperative day. The patient was released from the hospital on the tenth postoperative day, at which time the wound was rapidly closing and motion in the knee was nearly complete.

CONCLUSIONS

1. A penetrating wound may be the entrance point of a foreign body. The foreign body may be a large one regardless of how the wound is obtained or even if the patient is certain that no foreign body is present. X-rays should never be omitted, for they often reveal the presence of an unsuspected foreign body.

2. Infected knee joints are emergencies and should not be temporized with by employing aspiration.

3. Early arthrotomy is advisable but drains should not be inserted into the joint cavity.

4. Active motion of the knee joint following incision and drainage is the best method of avoiding ankylosis of the joint. This can be accomplished by an overhead sling which the patient can pull himself, thus flexing the knee and expressing the pus.

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Pseudocysts of the Pancreas

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TWO cases of pseudocysts of the pancreas are here reported. The first case is of interest since I saw the cause, acute pancreatic necrosis, and eight months later operated upon the cyst. The second case is of interest because it simulated gastric cancer.

CASE REPORTS

CASE 1. Mrs. M. W., age 36, for four years had suffered attacks of pain in the right upper quadrant which lasted a day and were accompanied by vomiting. She entered the hospital February 24, 1938, because an attack, which had begun the day before, was more severe than her previous ones and was growing worse instead of better. Her temperature was 100°, pulse 100, respiration 20, WBC 21,000. The following day her WBC had dropped to 10,100 but she was otherwise the same. There was marked tenderness, accompanied by muscle spasm, in the right upper quadrant. With the diagnosis of acute gallbladder disease, operation was done under spinal anesthesia. The findings were: a large amount of slightly bloody serum; liver markedly swollen and mottled; gallbladder large, thin, and containing many calculi; pancreas very hard and swollen. There was a very congested area studded with the yellow spots of fat necrosis in the tissues near the head of the pancreas. The gallbladder was emptied and drained, and a Penrose drain was placed down to the pancreas. Diagnosis: moderate acute necrotic pancreatitis with gallstones. The operation seemed to have done little to help her, and it was three weeks before her fever dropped to normal.

During the latter part of her hospitalization, she described a soreness in her left epigastrium which persisted. Gradually she began to complain of gaseous distress and left epigastric pain that extended between her shoulders in the back with occasional vomiting. On November 1, 1938, eight months after her operation, her symptoms had increased and a large rounded mass, somewhat to the left, was seen and felt in the epigastrium. A skiagraph was made and a pancreatic cyst diagnosed. She was operated upon three days later.

The operation was done under spinal anesthesia. The empty stomach was stretched like a ribbon around the left anterior side of a large cyst, perhaps twice the size of a large grapefruit. Aspiration above the pyloric part of the stomach of a large amount of clear fluid allowed the cyst to be grasped and opened. The remaining fluid, brown and thick, contained many small pieces of necrotic tissue and was removed by suction. Inspection of the interior of the cyst revealed at the base an area about 2½ inches long by an inch wide of dark gray necrotic tissue. This was the area of necrotic pancreatitis that had produced the cyst. A piece of the wall of the cyst was taken for microscopic examination, and the incision into the cyst was closed around an inch-wide tube. The cyst was then stitched to the peritoneum and the wound closed. Drainage was free and many small necrotic pieces came away, and once a much larger piece was picked out of the tube. At present the discharge is much less and a smaller drain tube is in place. Later, when the discharge becomes clearer, this will be removed.

CASE 2. Mr. O. McC., age 49, had run his automobile at high speed into a telephone pole, wrecking the car and badly bruising himself, two years before I saw him. One year later he began to suffer from a dull heavy pain across the lower chest. At times the pain was quite severe and often seemed to cause vomiting. Cholecystograms showed a poorly functioning gallbladder. He was not seen again for eight months; by then he was greatly changed. He had lost forty pounds and looked emaciated. Suffering from a steady epigastric distress, he ate very little and then usually vomited. A large mass extended across the epigastrium. There was no free hydrochloric acid shown by fractional gastric analysis, and his Wassermann test was negative. With the X-ray examination showing a large filling defect in the stomach, it was thought that he was suffering from a malignant tumor.

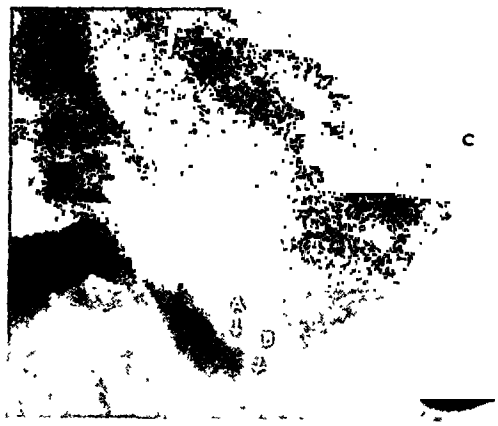


Fig. 1. A. Depression of the duodenal cap.
B. Pyloric ring.
C. Lesser curvature.

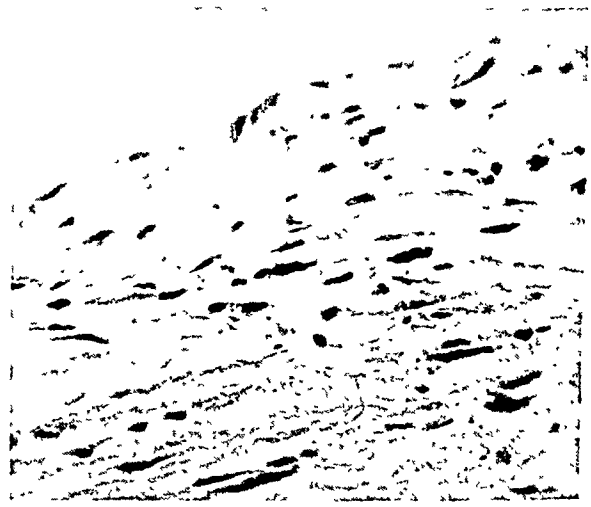


Fig 2. Microscopic Examination: "The wall is of connective tissue lined with endothelium. There are many capillary blood vessels and some lymphocytes. Diagnosis —pancreatic cyst."

The operation was done under ethylene anesthesia. A large mass, slightly elastic to touch, extended from the diaphragm to below the stomach level. There were many adhesions of the various organs. Correcting the diagnosis to cyst, a large amount of brownish fluid was removed by aspiration above the stomach, the sac opened, and the emptying completed by suction. On inspection of the base, it was found that the sac seemed to come from the head of the pancreas, but there was no necrotic tissue. Since no line of cleavage of the sac wall was found, it was closed tightly around a rubber tube and the sac sutured to the abdominal incision. Recovery was uneventful and for the past three years he has experienced no further trouble from

*From the Dakota Clinic, Fargo, North Dakota.

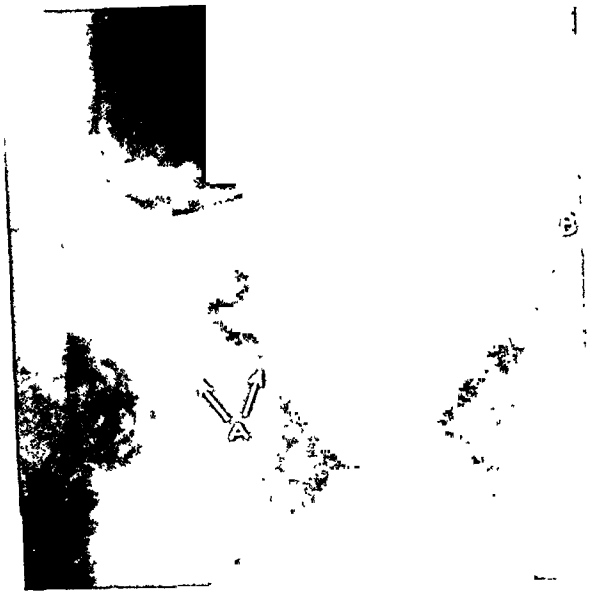


Fig. 3. A. Deformity of the antrum.
B. Greater curvature of stomach.

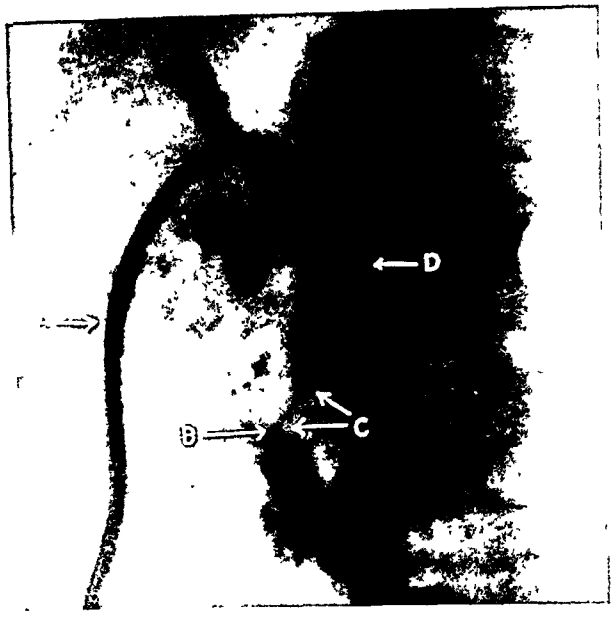


Fig. 4. A. T-tube in common duct.
B. Region of Vater's papilla.
C. Spasm of sphincter of Oddi.
D. Dilated common bile-duct.

his cyst. Section of the cyst wall showed no epithelial lining, "but dense fibrous tissue with a few lymphocytes and fibroblasts —probably a cyst of the pancreas."

DISCUSSION

The neoplasm of the pancreas most often occurring is carcinoma of the head of the pancreas. Some of the other tumors are so rare that merely to mention them is sufficient. These are hydatid cysts, dermoid cysts and congenital cysts. The latter are small and often associated with cystic disease of the kidneys and liver. There remain, then, three pancreatic tumors which are of importance: the rare retention pancreatic cyst, lined with epithelium, the rare adenomatous type lined with epithelium and often with solid elements in it, and the pseudocyst lined with endothelium.

The adenomatous tumors may be solid tissue or mostly cystic in character. The solid adenomas have become of great interest since they may cause grave hypoglycemia, and the hypoglycemia can be cured by removal of the tumor.

The retention pancreatic cyst is caused by obstruction of a duct within the pancreas, and the gradual collection of pancreatic fluids behind the obstruction. At least in the earlier part of its existence it is lined with epithelium.

The pseudocyst is next to carcinoma in frequency. As the name indicates, it is not a true cyst of the pancreas, but is formed in the following way: When trauma or a localized necrotic pancreatitis causes destruction of a part of the gland, the fluids that accumulate rupture into the retroperitoneal space, and a pseudocyst is formed with peritoneum as its covering. True cysts grow slowly, pseudocysts comparatively rapidly. Automobile accidents are likely to increase the number of pseudocysts.

The manner in which acute necrotic pancreatitis is caused is interesting. While Dragstedt advanced the theory that it is due to acute infection of the pancreas, most of the students of the subject agree that retrojection of bile and pancreatic enzymes from the common duct into the pancreatic duct and so into the pancreas, is the cause. Here the inert trypsinogen in some way is converted into trypsin, and autodigestion of the pancreas follows. Opie in 1901 gave the first description, and showed that the retrojection was caused by a gall-stone obstruction at the ampulla of Vater. At the present time iodized oil is often injected through a T-tube following common duct drainage and the duct visualized. Frequently an obstructing spasm of the sphincter of Oddi is seen, and not infrequently the backing up of the oil into the pancreatic duct.

Spasm of the sphincter of Oddi with retrojection of the common duct fluids into the pancreas and autodigestion is now the most accepted cause of acute pancreatic necrosis. Treatment of pancreatic cysts is surgical. Pseudocysts are emptied, inspected, drained and sutured to the wound. True pancreatic cysts can be cured in the same way; however, if there are solid elements within the sac these should be destroyed by cautery or the thought of removal of the entire cyst wall considered.

Accurate Determination of Compatible Blood for Transfusion*

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THE subject of blood transfusion is or should be of considerable interest to the whole medical profession because every practitioner, regardless of his specialty or the general nature of his practice, is confronted from time to time with ailments which call for or render imperative the intravenous administration of blood. A generation ago the actual transplantation of blood from donor to recipient was still in the experimental stage and was a technical problem, which was so difficult as to render almost negligible the number of transfusions which were attempted. The simple solution of this problem transformed the situation so completely that today transfusions are performed without difficulty everywhere by a large and ever increasing number of physicians and surgeons with such gratifying results in most instances that the inherent dangers are frequently lost sight of, or are too little appreciated. In fact, the simplicity of the citrate method has been cited as a disadvantage because it places the transfusion of blood into unreliable and dangerous hands.

It is a fact that severe and fatal reactions are being reported from large and important medical centers where accurate data are recorded, and that here these disasters are a matter of very serious concern. What the situation is in hospitals and private practice conducted without sufficient or even any laboratory facilities, is a matter of conjecture. Without doubt, it is less satisfactory than in the more favored places. The following quotation from a letter written by a physician[1] and printed recently in the *New England Journal of Medicine*, emphasizes the occasional occurrence at least of these untoward reactions. "Within the past two years it has been my sad privilege to see in consultation at five different hospitals in and around Boston as many serious transfusion accidents. The first four were fatal; the fifth undoubtedly would have been had not the surgeon immediately withdrawn the needle when the reaction occurred. . . . Since this is solely my own experience, it is certain that other such serious accidents have occurred in this and nearby communities, and that most of them have probably gone unreported."

Investigation of these alarming and fatal complications rarely discloses etiological errors of technique committed in the operating room or at the bedside. Unskilful performances in the withdrawal and administration of blood seldom result in anything more serious than temporary failure of the patient to receive the blood. The cause of these disasters is usually found in errors of laboratory technique and interpretation pertaining to typing and compatibility tests. No mistakes in clinical laboratory procedures can possibly give rise to more serious results. Adequate and practical laboratory safeguards are now available for this work. Therefore, every typing and compatibility test should be performed and interpreted with sufficient perfection to prevent the selection of an incompatible donor. This requires laboratory facilities and trained technicians which many hospitals do not possess. Even fairly good and complete equipment with technicians who have had recognized training does not insure dependable laboratory work. The more exacting and complicated tests require for accuracy the supervision of the laboratory by a thoroughly competent clinical pathologist. There is no substitute for any deficiency in this respect which is safe for the patient, and which should be satisfactory to the clinician. Laboratory procedures in general are becoming more important in every-day practice, and at the same time alarmingly more dangerous when imperfectly performed. It is evident, therefore, that wholly unsatisfactory conditions prevail for the safe selection of compatible donors in many places where the transfusion of blood is not infrequently performed. It would be interesting to conduct investigations among the responsible personnel of those institutions where transfusion deaths have occurred, to learn how seriously or how lightly they view such occurrences which "can only be due to flagrant negligence or sheer ignorance."[2] A cause for some of this ignorance is to be found in the failure of most standard text-books of surgery and laboratory diagnosis in the hands of medical students and recent graduates to reflect the safest and best information relative to the selection of a donor. Instruction, too, in most of our medical schools is not at all sufficient to enable the medical student, or intern, to make an accurate compatibility test by himself upon which the life of the patient depends. The laboratory service of the internship is completed by many who fail to receive adequate training there, either because it is not required of them or is not available. The laboratory technician likewise fails, not infrequently, to receive training sufficient for the accurate performance of these tests.

The negligence which occurs must always rest primarily upon the clinician in charge of the case, and upon whose authority the laboratory work is carried out and the transfusion performed. It is his duty to safeguard his patient against the common and remote hazards of these procedures. A critical attitude of mind should be adopted in order to detect errors due to ignorance or negligence on the part of the technician or intern, or any other individual who plays a responsible rôle. Strange as it may seem, the clinician may not only fail to interest himself in these matters upon which the

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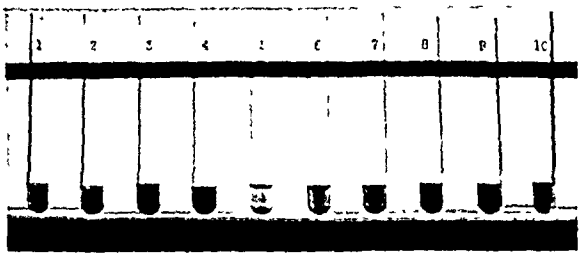


Fig. 1. Photograph of the rack of ten test tubes sometime after completion of the mixtures. Final reading for agglutination and hemolysis is made only after the expiration of 1½ hours

Tubes No.	1	2	3	4	5	6	7	8	9	10
Donor's Erythrocytes 1—20 Dilution	0.1	0.1	0.1	0.1	0.1					
Donor's Serum				0 4		0.1	0.2	0.4		
Recipient's Erythrocytes 1—20 Dilution						0 1	0.1	0.1	0.1	0.1
Recipient's Serum	0.1	0.2	0.4						0.4	
Physiological Saline Solution	0.8	0.7	0.5	0 5	0.9	0.8	0.7	0.5	0.5	0.9

Fig. 2 This chart shows the exact content of each of the ten tubes employed in the compatibility test

life of the patient depends, but may actually become impatient over the delay necessary for accurate laboratory determinations.

A recent survey of blood transfusions in America conducted by questionnaire mailed to about 700 hospitals approved for internship under the authority of the Blood Transfusion Betterment Association of New York City, netted 350 replies which indicate, according to Levine and Katzin[3] that in the selection of compatible donors 5 depend upon blood grouping alone, 30 upon direct matching alone, and 310 upon both grouping and matching. The universal donor is used at least occasionally in nearly two-thirds of these hospitals and in 69 of them frequently.

Until six years ago the procedure followed in the clinical laboratory of Trinity Hospital, Minot, consisted of blood grouping followed by cross matching on a cover slip of the donor's and recipient's corpuscles and serum, with examination at intervals during a 20-minute period to determine the presence or absence of agglutination. This work was done by graduate technicians from good schools under the supervision of a clinical pathologist. Severe transfusion reactions were not uncommon during this time. This procedure was terminated following a fatal hemolytic reaction which occurred soon after Dr. P. J. Breslich became director of the laboratory. He introduced another method, the description of which is given further along in this paper. It has proved to be uniformly satisfactory in the selection of donors for more than 1,200 transfusions.

Blood grouping alone by means of known serums fails in accuracy occasionally because of weakness of the titer of either the serum iso-agglutinins or of the iso-agglutinogens of the cells tested. The resultant error usually places in Group IV according to the Moss nomenclature members of the other three groups. The allowance of too short a time for the agglutination reaction may give rise to the same mistake. The final reading should be delayed for at least an hour, particularly in the case of infants or young children. The presence of subgroups of agglutinogens also causes errors in blood grouping and compatibility which are not revealed. Furthermore, blood grouping of this type fails to indicate the presence of isohemolysins which may not only vitiate the test and thereby give rise to trouble indirectly, but may themselves be the cause of severe and fatal reactions.

The evidence just presented against blood grouping alone is sufficient to condemn this procedure as dangerous and inexcusable.

Direct matching as usually practiced, consists in testing upon a cover-slip the agglutination reaction between the cells of the donor and the serum of the recipient. This examination fails completely to give important information concerning the reaction between the cells of the recipient and the serum of the donor. Errors may occur due to weakness of the titer such as has already been described. Hemolysins are not identified by this technic nor are subgroups prevented from causing serious mistakes. Cross matching or the additional testing of the agglutination reaction between the donor's serum and the recipient's cells is an added safeguard of considerable value, but it is still deficient as usually carried out on a cover-slip because of its shortcomings with respect to weakness of titer, subgroups and hemolysins.

In the light of our present knowledge of subgroups of iso-agglutinins and iso-agglutinogens and the mistakes in grouping which these anomalies give rise to, the employment of the universal donor can no longer be viewed as a safe procedure even upon theoretical grounds. It has already been pointed out that these errors usually result in placing members of the other three groups into the so-called universal donor class, a serious mistake always but particularly so where universal donors are still used. Interns as a class cling to the belief in universal donors and thereby give proof of the deficiencies of their instruction on this subject while medical students. The universal recipient should likewise be rejected because of the anomalies just mentioned and the resulting errors of grouping. The danger of insufficient dilution of an incompatible serum is another reason for this unfavorable attitude. Abramson[4] reported in THE JOURNAL-LANCET three years ago a death due to hemolysis which resulted from the transfusion of a so-called universal recipient with blood of a different group.

The technic introduced into our own laboratory by Dr. P. J. Breslich is a modification of the Landsteiner test tube method. Preliminary typing is carried out in order to reduce to a minimum the number of test tube compatibility tests necessary for selecting a donor. The typing and cross matching are not directly involved in this final determination which concerns only the reactions seen in the test tubes.

Ten test tubes are arranged in numerical order in a rack. Fig. 1. Into each of tubes 1, 2, 3, 4 and 5 is placed 0.1 cubic centimeter of a 5 per cent saline sus-

pension of the donor's erythrocytes. To each of tubes 1, 2 and 3 is added the recipient's serum in the following amounts respectively: 0.1, 0.2, and 0.4 cubic centimeters. Four-tenths of a cubic centimeter of the donor's serum is added to tube 4. Into each of tubes 6, 7, 8, 9 and 10 is placed 0.1 cubic centimeters of a 5 per cent saline suspension of the recipient's erythrocytes. To each of tubes 6, 7 and 8 is added the donor's serum in the following amounts, respectively: 0.1, 0.2 and 0.4 cubic centimeters. Four-tenths of a cubic centimeter of the recipient's serum is added to tube 9. Physiological saline solution is added to the 10 tubes in amounts sufficient to make the content of each equal to 1 cubic centimeter. In tubes 1, 2, 3, 6, 7 and 8 occur the cross reactions between the serum of both the donor and the recipient in three different dilutions and their erythrocytes. In tubes 4, 5, 9 and 10 occur control reactions between serum and erythrocytes of the same origin in saline solution and between the saline solution and the erythrocytes alone of both the donor and the recipient.

Blood in the amount of 10 cubic centimeters is withdrawn for the examination. To 2 cubic centimeters are added potassium oxalate crystals to prevent clotting. The serum from the remaining portion is recovered after separation from the clot. The oxalated blood is centrifuged and the cells removed. They are washed in physiological saline solution three times to rid them of serum. The final packed cell mass in the centrifuge tube is converted into a 5 per cent suspension by the addition of physiological saline solution.

After preparation, the tube mixtures are allowed to stand for 1½ hours. Delayed reactions are not uncommon. Incompatibilities, if present, are usually apparent within 40 minutes but, for absolute safety, the full 1½ hour observation period is necessary. In approximately 4 per cent of tests between bloods of the same group incompatibility is found which is usually due to agglutination but occasionally to hemolysis. If the macroscopic evidence of agglutination is at all doubtful, a rare event, a microscopic examination is carried out.

This test tube method has been relied upon at Trinity Hospital for all of the more than 1,200 transfusions performed during the last six years. There have occurred no reactions of incompatibility whatsoever to disturb either the patient or the physician.

The extra time and effort which this test requires is fully justified by its incomparable superiority as a laboratory procedure upon which life depends.

CONCLUSIONS

1. The transfusion of incompatible blood is still a cause of an appreciable number of deaths in this country.

2. The transfusion of incompatible blood is inexcusable and is always due to "flagrant negligence or sheer ignorance."

3. Text-books, medical schools and clinical laboratories fail, as a rule, to enlighten medical students and interns regarding the safest and best methods of determining blood compatibility.

4. The dangerous belief in the existence of a safe universal donor is almost fanatically indulged in by most interns and many practicing physicians.

5. The methods of determining blood compatibility commonly employed in this country are manifestly inadequate and are frequently performed by poorly trained and inexperienced physicians and technicians.

6. An absolutely safe and practical method of selecting compatible donors is available to all properly trained medical men and technicians.

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The Treatment of Ruptured Duodenal Ulcer

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EARLY diagnosis, quick decision and good surgical judgment are urgent in the care of ruptured duodenal ulcer. As so often happens, the onset may occur shortly after the ingestion of a large meal with the consequent spilling of quantities of food into the peritoneal cavity, or may occur following prolonged physical exertion which reduces resistance by exhaustion. The patient who has suffered a perforation will usually be lying down in the so-called jackknife position with the thighs in extreme flexion. His facial expression is one of great anxiety and he may have superficial signs of shock. A history of indigestion may or may not be elicited. The patient will generally state that without warning he was seized with a sudden severe pain in the right upper quadrant of the abdomen which was quickly referred to the lower quadrant on the same side. He will probably complain bitterly of pain in the right shoulder. The most constant and characteristic symptom is the generalized board-like rigidity of the abdominal muscles. An X-ray picture revealing a gas bubble beneath the diaphragm is corroborative of the above findings.

There are two questions which must be decided after the diagnosis is made: (1) what to do; (2) how to do it. The initial question is answered very easily, the treatment necessary being obviously surgical. The second question, "How shall we do it?" has two answers, one radical and one conservative. Each has its advocates and each numbers among its followers some of the outstanding surgeons of America.

A conservative group advocating simple closure of the perforation believes that the mortality is lower and that fully 65 per cent of those so treated will receive a complete cure; of the remaining 35 per cent, 10 to 15 per cent will require gastroenterostomy for obstruction, and 20 per cent will need dietary supervision because of gastric distress. Those in the less conservative group who favor closure of the perforation with immediate gastroenterostomy contend that the mortality is likewise reduced. They also contend that gastroenterostomy aids in the healing of the ulcer and helps in preventing postoperative leakage and hemorrhage, as well as insuring a more comfortable convalescence.

Pyloroplasty and partial gastrectomy following closure of the rupture, each has its champions but the results do not appear to be as satisfactory as in the other types of operation. With the exception of those cases in which it was very evident at operation that obstruction was present, we have in our own practice employed the operation of simple closure, believing that with a patient so desperately ill the quicker one "gets in and gets out" the better the patient's interests will be served. We also were influenced in adopting the simple closure for these cases because of the long accepted thought that perforation meant cure. A continuous suture placed at right angles to the long axis of the bowel will close the perforation with a minimum of encroachment on its lumen. We customarily follow this by suturing a pad of fat over the site of the closure.

The question of drainage of the abdomen following operation for perforated duodenal ulcer is likewise debatable. It is our practice never to drain under eight hours and not then if there has not been too much soiling of the peritoneal cavity. We are influenced somewhat in our decision by the condition of the patient's mouth and throat as regards sepsis. It has been frequently shown in the laboratory that hydrochloric acid inhibits the growth of bacteria and, since high acid content is the rule in duodenal ulcer, it would follow that peritonitis from this source should be of minor importance. It is felt by many that drainage of the abdomen increases the hazard of bowel obstruction as well as the incidence of postoperative hernia and it has been shown that improperly placed drainage tubes have been followed by duodenal fistula.

The postoperative management of these cases is of great importance. Since the advent of the Wangensteen nasal siphonage, it has been our practice to use it in every case. The patient is far more comfortable, upper abdominal distress is reduced to a minimum and fluids may be given by mouth freely. We feel that this procedure has been a considerable factor in lessening the indication for immediate gastroenterostomy. On the fourth day, the sippy diet is begun but no alkalis are given. Following the sippy diet, the patient is gradually taken over to a bland semi-solid diet on which he is requested to remain for six months. He is advised to take milk in between meals for the same length of time. Smoking and alcohol in any form are indicated just about as much as alcohol and a shotgun on a hunting trip. We feel that one is almost wasting his time trying to successfully treat anyone who smokes or drinks alcoholic beverages.

Since 1932, twelve patients have been operated on for perforated duodenal ulcer at McKennan Hospital in Sioux Falls, South Dakota. All twelve patients were males and they ranged in age from 23 to 50 years. There was an immediate mortality of 8⅓ per cent, one patient dying on the seventh day of pneumonia. Of these twelve patients, seven were operated upon within eight hours of the perforation, and five after eight hours had elapsed. Drainage was instituted in exactly half of the cases. Simple closure was performed in all, though they fell on the services of five different surgeons. Delayed gastroenterostomy was done on only one and this was two months after the primary closure. It was necessitated because of uncontrollable pain and obstruction. Aside from the fatal case of pneumonia, there was only one other complication. This occurred in a case that

was not operated upon until twelve hours following the perforation. On the seventeenth day, the wound was found wide open and a secondary closure was done. The patient left the hospital on the twenty-sixth day in good condition. A follow-up questionnaire revealed that two patients are still required to restrict their diet. The remaining ten are eating as they wish and are free from symptoms.

CONCLUSIONS

We believe with Dr. Robert F. Sharer of Oak Park, Illinois, that if primary gastroenterostomy or any of the other more radical operations are to be combined with simple closure, these operations must do one of two things; reduce the primary mortality or improve the end results. Though the series of cases presented in this brief article is relatively small, our findings do not indicate that more extensive surgery is necessary. Only one patient died and that one from pneumonia on the seventh day. Gastroenterostomy could not have helped him. The one patient on whom secondary gastroenterostomy was later performed, might have avoided the second operation had the more radical procedure been followed in the first place.

Actinomycosis of the Head and Neck*

Pathology, Diagnosis and Treatment

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A STUDY of the pathology of actinomycosis makes one realize the futility of potassium iodide and similar therapeutic measures often used in the treatment of the disease. In this paper an endeavor will be made to show the close relationship between the pathology and treatment (primarily surgical) of actinomycosis.

In man, the ray fungus (Israel type) is usually considered the ordinary cause of the disease. The common pathogenic form, Actinomyces bovis, is anaerobic, and has great resistance to heat, light, drying and disinfectants. Due to the fact that it is extremely difficult to culture the pathogenic form, this method of diagnosis is not practical.

MEANS OF IDENTIFICATION

Because the clinical history and physical findings in most cases are not pathognomonic, one must depend almost entirely on laboratory findings for a final diagnosis. The sulphur granules are quite visible to the naked eye. They have a radiating lobulated structure which is quite characteristic. They are best obtained by straining the pus through several layers of gauze. The granules are translucent, sulphur yellow or brown in color. They are best removed as a wet preparation made with strong sodium hydroxide on a glass slide, crushed and stained with Gram's solution. The lobulated colony with gram positive mycelial filaments may be distinguished under the low power microscope. The most reliable method in the writer's experience consists of centrifuging a large quantity of pus and embedding the sediment in paraffin. Sections are cut and stained with hemotoxylin and eosin, and with Gram's solution. Characteristic colonies as in Figure 1 are then sought. Biopsies from an area of liquefaction will generally show the granules. If they are taken from a dense indurated area without suppuration, the organisms will probably not be found.

A very interesting clinical pathological characteristic of actinomycotic abscesses and nodules is that although they may be quite large, tender and fluctuant, upon aspiration or incision they may be found to contain a very small amount of pus. This is important also from the diagnostic standpoint. Frequently, the first one to see these lesions and to aspirate or incise them has the advantage. Although only a few cubic centimeters of pus are obtained, this may contain the colonies while all subsequent punctures yield a dry tap or produce no granules, because they frequently drain out in a short time. In some instances, it is very difficult to obtain the organism in pus from a sinus of long standing. One, therefore, should save all the material obtained from the first aspiration and study it both by smear and by stained sections for the characteristic colonies.

PORTAL OF ENTRY

There is considerable difference of opinion regarding the mode of the actinomcotic infection. Two principal theories have been held for many years. The first, proposed by Bostrom and very widely adopted, is written into almost all the textbooks and is accepted without absolute proof. He claims that the causative agent has its normal habitat on grasses, grains and straw, and gains entrance into the body by way of abrasions in the mucous membranes of the gastro-intestinal tract. From a saprophyte in old sod soil, it gains access to the grains

* Studies from material of the surgical department, University of Minnesota.



Fig. 1. Microscopic paraffin section of centrifuged pus, and stained with hematoxylin and eosin



Fig. 2 Actinomycotic granulation tissue with numerous multinucleated giant cells

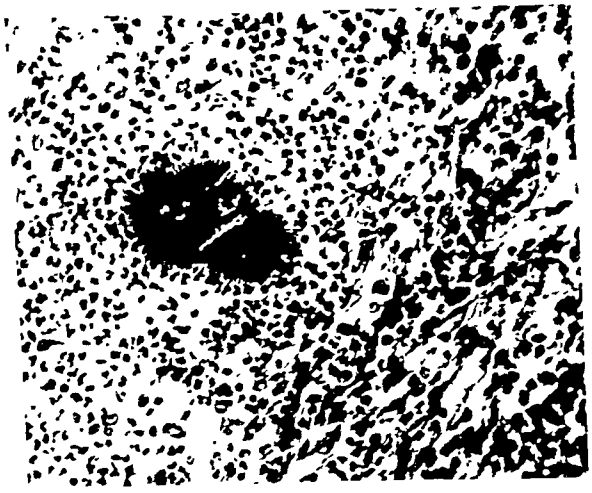


Fig. 3 A young colony and early granulation tissue reaction showing the characteristic zones

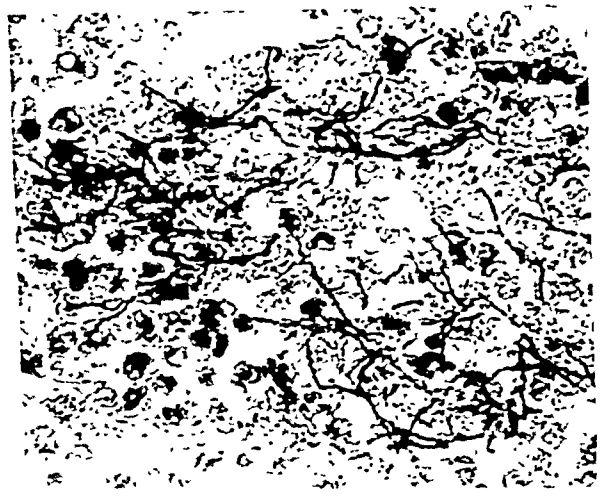


Fig. 4. Actinomycosis of the spleen. Note detached mycelial filaments surrounded by wandering cells

and by this medium becomes capable of infecting man. This organism is an aerobe, very easily cultivated. It is not transferable to animals by inoculation.

The second theory was brought forth by Wolff and Israel, who described the organism as being a normal and constant inhabitant of the gastro-intestinal tract, which usually caused infection by passing through an abrasion in the mucous membrane. This organism is anaerobic, grows only at body heat and is rather difficult to cultivate.

Infection along the gastro-intestinal tract may be explained by ingestion, whether the fungus is normally present there or not; primary infections of the respiratory tract may be due to aspiration or to penetration of the esophagus by the organism. The greatest difficulty in tracing the course of infection is due to an inherent characteristic of this disease. The point of inoculation is quite frequently impossible to find, due to the fact that the initial lesion tends to heal. Probably one of the most important predisposing factors for the implantation of the organism into the tissue is trauma.

In general, it may be said that the mouth is the most frequent portal of entry and localization of actinomycosis, while other portals of importance may be found in the lungs and intestines, and rarely in external lesions. From these foci, actinomycosis may actively invade every organ of the body by continuity or by the blood stream.

For the most part, the fungus diseases are not contagious. Direct transmission from animal to man has never been proved, and most of the attempts to convey the infection from human lesions to animals have been attended by failure.

General Pathology

One may define the disease as a granulomatous infection following a chronic but progressive course in which are produced small granules (sulphur bodies) containing the radiating filamentous structure with hyaline clubs at the periphery of the parasite. An acute and chronic



Fig. 5. Actinomycosis of the neck in a girl age thirteen.

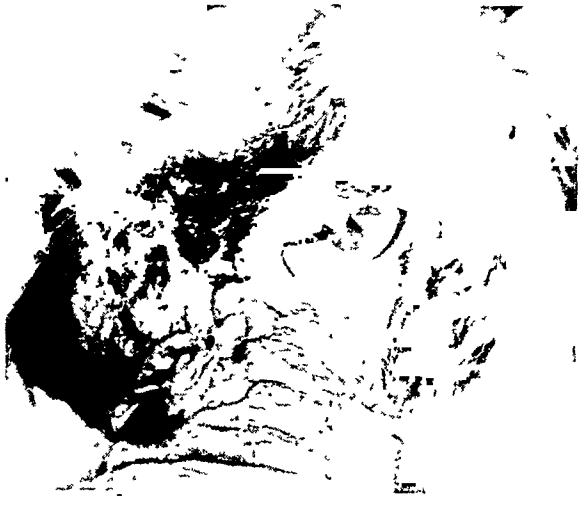


Fig 6. Rapid extension of the actinomycotic process during inadequate treatment

infectious process may be seen progressing at the same time. A granuloma is produced which is tumor-like in character in that large nodules are produced. This granuloma consists of an acute and chronic type of granulation tissue, and more specifically is composed of pockets containing fungus colonies imbedded among polymorphonuclear and mononuclear cells surrounded by a rather vascular zone of epithelial cells, multinucleated giant cells, (Fig. 2), eosinophiles, and plasma cells. This zone in turn is bounded by dense and sometimes hyalinized fibro-connective tissue (Fig. 3). The vascularity of this granulation tissue is of a great importance from the standpoint of operative treatment. Along with the dense fibrous tissue reaction, there is a simultaneous degenerative process due to invasion of the connective tissue by the fungus. The former is a tendency to walling off and healing, and the latter is an advancement by suppurating, degenerating and liquefying. When softening takes place, there is extensive lipoid degeneration with production of abscesses, cavities, and intercommunicating pus channels filled with purulent material containing yellow granules. Sinuses may form and discharge purulent exudate and inflammatory material. The healing process is characterized by the formation of large nodules of cellular fibrous tissue.

It is probable that extension takes place principally by the separation of the mycelia from the colony, picked up by wandering macrophages which carry them into neighboring tissue (Fig. 4). These strands may become broken off or detached from the original colony and produce a new colony. Thus the infection may spread directly into all the surrounding structures.

Special Pathology

The various tissues seem to respond in a fairly definite manner to actinomycotic organisms. The mucous surfaces of the body are rather resistant to the ray fungus. It is uncommon to find actinomycotic granulomas in mucous membrane; the organism tends to burrow away from such surfaces, and very often no trace can be found of the portal of entry in the mucosa. It is possible that the secretions in the oral cavity as well as in the gastro-intestinal tract tend to prevent the growth of the organism. Although it appears that some tissues are more resistant than others, any tissue may be invaded and destroyed by this infectious process. In man, bone seems to be fairly resistant, but periostitis is seen not infrequently. The regional nodes may be hyperplastic, but it is certainly rare for extension to take place through this system. It frequently disregards fascial planes, but most of the growth takes place in the connective tissue. Cope and Goode state that there is a distinct integrity of the blood vessels in actinomycotic lesions. However, it has been found in the material at hand that there is frequently rather marked fibrosis in the vicinity of the larger vessels of an organ and not infrequently one finds a direct invasion into the largest vessels. A complete occlusion of the vena cava due to an actinomycotic thrombus has been noted.

Cervicofacial Form

The cervicofacial region is most often affected; most authors state that 60 per cent of the cases fall in this group. The upper jaw is rarely invaded, but the infection involves the gums, cheeks, teeth sockets, or the back of the mouth in the region of the molar teeth. The spread of the infection is away from the primary site toward the skin along the line of least resistance. Later localization takes place as a small indurated area at the angle of the jaw, or as a more extensive condition involving the cheek in the parotid region. The parotid-masseter actinomycosis is the most typical and common form. There may be extensive invasion of the tissues around the mandible, but rarely is there anything more than periosteal involvement, unless the infection starts about the socket of a diseased tooth. Submaxillary infection may occur as an infection along Wharton's duct,



Fig. 7. Actinomycosis of the head and neck of two years duration.

Fig. 8 One year after radical excision of the actinomycotic process No recurrence



Fig. 9 Actinomycosis of the parotid-masseter region Two months duration.

but the most common route is through the mucous membrane of the floor of the mouth. Low neck lesions may be due to direct extensions from the pharynx or trachea. There is generally little swelling on the inside of the cheek. As the lesions approach the skin during the course of softening and suppuration, numerous abscesses may occur in the involved tissues, and subsequently rupture through the skin to establish one or several draining points. The stage of induration may last several months. After drainage is established, the condition may subside and remain quiescent for a long time. Subsequently there may be more softening, abscess and sinus formation. According to Shiota, the acute features of this process depend, at least to some extent, on mixed infections.

From the parotid region, the process may extend into the temporal muscle, scalp, forehead, or to the back of the ear. If the course remains unaltered, the lesions in the neck tend to extend downward and sometimes backward. The muscles become infiltrated down to the base of the neck; direct extension into the mediastinum or the apex of the lung may follow. When the extension is backward, the vertebral column or base of the skull may become involved, and subsequently the meninges and spinal cord attacked. When the submaxillary region is involved, there may be involvement of the gland, a direct extension into the tongue, the ribbon muscles of the neck, and the submental region. The trachea is infrequently affected, even by secondary infiltration.

Patients first complain of a stiffness of the jaws, and later of an inability to open and close the mouth. Later swelling occurs which may or may not be painful. In some instances, patients consult dentists and frequently considerable oral sepsis and dental caries are found. Patients may complain early of trigeminal neuralgia. The induration may persist for some time before suppuration takes place. The most common errors in diagnosis are tuberculosis, malignancy, and dental root abscess, or cervical abscess, secondary to infected teeth. After these lesions exist for awhile, there may be considerable cachexia and anemia with a low grade or hectic type of fever.

It has been said that primary actinomycosis of the tongue is quite rare; however, Shelmire has quite appropriately pointed out that the rare lingual localization of the disease in man is more apparent than real. At the onset, there is some induration and the patient may complain of slight or no pain, stiffness and swelling. As softening takes place and the lesion increases in size, there is more disability. If the lesion is not incised, an abscess forms which may rupture. Several sinuses may appear as extension takes place. Very rarely does a diffuse actinomycotic abscess of the tongue occur,[15] but a diffuse multilocular abscess with numerous draining sinuses may form.[4] From a lesion in the tongue, direct extension to adjacent tissues readily takes place.

TREATMENT

Of the various forms of treatment, surgery, radiation, and potassium iodide have proved to be the most valuable. Hyerdahl has reported good results with radiation therapy in actinomycosis of the head and neck, and prefers it in all types of actinomycosis to practical exclusion of all other therapy. Magnusson has shown that actinomycosis in cattle is usually due to the Actinobacillus and that massive doses of potassium iodide have been effectual, but have had very little effect on lesions caused by the Actinomyces bovis. Reynolds and Henrici have shown that iodides have no effect on actinomyces in vivo or in vitro. They obtained growth in media containing as much as 10 per cent potassium iodide. It was noted in several of the cases presented that, although the patients felt better physically, and the lesions did not seem to progress very much for a time, this manifestation was only temporary; the patients died from the disease. Therefore, it is doubtful that iodides exert any specific action on this parasite; and it is a question whether they stimulate fibrous tissue or not. It has not been possible to find any reported cases of complete

cure of proved actinomycosis by the use of potassium iodide alone, or of radiation therapy alone, although some apparent remissions have been demonstrated.

In attempting to eradicate the disease process, one must not rely on conservative methods, for as a whole they have proved to be failures. Surgical measures such as incision, excision, curettement, and drainage should have precedence over all other forms of therapy. It may not be necessary at first to do a complete extirpation of the disease process, as in cancer, since, in many instances promotion of adequate drainage alone may cure the disease. However, one must follow these cases quite closely, and if the disease does not clear up, more radical methods must be employed.

One should not, however, limit his treatment to one form of therapy, but should use every accepted approach to cure that is known. It seems advisable to follow surgery with potassium iodide and adequate doses of deep X-ray in some cases. Recently there have been reports on the use of sulfanilamide on these cases, but the follow-up time has been too short to make any definite conclusions as to its efficacy. In infections of the head and neck and tongue, surgery is preferred, viz., excision, if incision, curettement and drainage do not suffice.

SUMMARY

In the treatment of actinomycosis, if possible, complete eradication of the diseased process by certain surgical procedures should constitute the chief therapeutic measure. For supportive measures, potassium iodide and irradiation therapy are of value, but they should be considered of secondary importance.

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The Prone Position for Gravity Drainage of the Abdomen

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THE idea of gravity drainage is not new. We know that it is the constant force of gravity which makes fluids seek the lowest possible level. How best to accomplish this in draining an abdomen is the problem.

Many years ago Fowler advocated the semi-sitting position, excellent in certain conditions but extremely fatiguing and occasionally injurious. In a hasty and no doubt incomplete review of the American literature on the subject, the earliest reference we were able to obtain was a paper by R. W. Harbin of Rome, Georgia, published in 1905 and entitled, "Ventral Decubitus as an Aid to Drainage for Diffuse Purulent Peritonitis," in which he observed that the value of postural gravity methods had "not been realized as fully as the merits of the procedure would warrant." In 1906 the late Robert C. Coffey of Portland, Oregon, writing on the subject, "The Principles and Mechanics of Abdominal Drainage," said: "The two steps in the process of drainage are, first, bringing the fluid in contact with the drain; second, delivery of the fluid to the surface. Gravity performs the first step in all intraperitoneal drainage and, when postural methods are applicable, may also be made to perform the second." By the ingenious method of making a plaster cast of the abdominal cavity and cutting across this at various predetermined levels, Dr. Coffey was able to demonstrate the differences in depth of the various parts of the abdomen when the body was in supine position. He also showed that either of the flanks would contain more fluid than the pelvis and that to drain these fossae by use of the Fowler position required a 60 to 70 degree elevation of the body, whereas complete gravity drainage of all the abdominal cavities was obtained with the patient in a lateral position.

William Coughlin of St. Louis in 1912 made the following statement: "It is granted that intra-abdominal

pressure favors drainage of the abdomen, let the opening be where it will, but surely that pressure can work to better advantage if it does not have to overcome the influence of gravity." He carried out a series of experiments in which he filled the abdominal cavity of a horizontal body with 1000 cc. of water and measured the amount obtainable by drainage through different incisions with the body placed in various positions. He demonstrated that while the pelvic cavity could not be completely drained of water by raising the supine body even "bolt upright," it could be completely emptied by turning the horizontally placed body in a slightly prone position.

W. E. Leighton of St. Louis made the following statement in a paper published in 1914: "If gravity is the most important factor, then it would seem as if the ventral decubitus would be the logical position, since there are no pockets formed in this position. The incision is at the lowest point for affording a rapid evacuation of any abdominal fluid. The success in drainage of the peritoneal cavity must depend to a certain extent on the rapid removal of the exudate, otherwise the adhesions, which form about the drains . . . might wall off collections from the drainage tubes."

In a paper entitled "Posture in Abdominal Drainage," Roland Hill of St. Louis in 1916 made the statement: "The greatest factors in abdominal drainage are gravity, intra-abdominal pressure, and capillary attraction. Of these, undoubtedly the most important is gravity."

Further benefits of gravity drainage were brought out by E. P. Quain of Bismarck, who in 1928 stated: "The draining of an exudate from any cavity takes place most quickly and efficiently if the cavity is opened at the bottom. The advisability of opening an abscess at its lowest point was known in ancient times. This principle holds true also when it is desired to drain an infected peritoneum through an opening in the anterior abdominal wall. Our patients have made safer, quicker and more comfortable recoveries since we learned to place them in bed in such a posture that the open wound is at the lowest point of the abdominal cavity. . . . An additional benefit from the ventral posture comes from the fact that the stomach and duodenum have less difficulties with retention and regurgitation, and the patient will be tortured with the stomach tube less often."

Confirmation of the above conclusions is to be found in a report by the Drs. Harold Glascock of Raleigh, published in 1936.

In a paper presented before the Nebraska State Medical Association in May, 1937, I made the following statements: "There is one fact of which little or no mention has been made by earlier writers, perhaps because it is so evident; namely, the anatomical suspension of the abdominal viscera. Our forebears of ages past walked much as do the quadrupeds of today. The spinal column is the ridge-pole from which are suspended the viscera and little change has resulted in mankind despite many generations of bipedism.

"Of choice the child most frequently assumes the prone position for sleep and many adults likewise, unless acquired adiposity prevents. No doubt this is the position of choice because the individual has found it to be of greatest comfort. The dorsal or supine position is an acquired one, and possibly the result of soft mattresses and sagging springs. No guadruped assumes such position for sleep except the fat house-dog and then only occasionally.

"In the prone position the abdominal viscera hang from their attachments in orderly folds or loops, the circulation being unimpeded by the weight of bowel contents. We are told, by those who have made a study of the lymphatics, that the most free routes of absorption are through the diaphragm, the mesentery and the pelvis, and that there are relatively no lymphatic channels in the anterior abdominal wall. With the body prone, free drainage of toxic substance is away from the area through which they are most readily absorbed and toward that part through which absorption is least active."

As a part of this paper, my associates and I reported the results in a consecutive series of demonstrably perforated appendicitis, all patients being from my personal service. To bring this consecutive series up to date, we can report 161 such cases with 7 deaths, a mortality rate of 4.4 per cent, as compared with a rate of 8.9 per cent previous to the adoption of this method. Our use of the prone position for gravity drainage has not been limited to abscess or peritonitis from appendicitis but has been extended as a routine to all types of drained peritoneal infections and infections elsewhere in the body with most encouraging results. We acknowledge a debt of gratitude to a little girl who first gave us the idea by voluntarily assuming the prone position after operation and whose convalescence was uncomplicated and unusually rapid.

As we have endeavored to point out in some detail in former reports, there are other factors which doubtless contribute to comfort and recovery in all drainage cases, namely, gentle handling of tissues, the nondisturbance of surrounding viscera, the introduction of a minimum of non-irritating drain material, the avoidance of enemata or laxatives until convalescence is well established, the use of morphine in *small* doses and then only to alleviate pain, and, finally, the proper use of the prone position. In this respect, with patients who have had a spinal anesthetic, we use a small pillow placed with its lower margin just below the costal border to elevate or obliterate the upper abdominal fossae. For patients who have had a general anesthesia, the head of the bed may be elevated slightly. In obese patients the right lateral, slightly prone position may be the best obtainable.

It is our conviction that with the use of gravity or "non-stop" drainage, aided by minimum trauma before, during and after surgery, there is a more rapid elimination of toxins, less nausea and distentions, less wound infection, a lower mortality, and a more rapid recovery than is obtainable by any other method with which we are familiar.

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Educational Opportunities in Student Health Programs*

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THE opportunity to commune with others who are working for the welfare of college students is always stimulating and inspiring. We are a relatively small group and our work demands a certain amount of isolation from our confreres. It is all the more gratifying, therefore, to gather in this, our national meeting, for exchange of personal experiences and for counsel on our own college health problems. Our daily schedule of office and classroom work is heavy and at the end of the day we are inclined to think of accomplishments only in terms of having done something to help the students who have called upon us during the day. We become so engrossed in this fascinating and satisfying job that we often overlook some of the broader implications of student health work. It is my privilege to review some of our accomplishments and to point out particularly some of the educational opportunities offered to us in our everyday contacts with students. A sabbatical year has given me an unusual chance to study the educational opportunities of health service and health teaching. A study of student health problems for the American Youth Commission has impressed me with the fact that our work has contributed greatly and promises to contribute more to the advancement of medicine, particularly through the channel of health education. It is my desire to call your attention to some of these contributions and my hope to stimulate your interest in the educational opportunities of student health programs.

Student health programs usually began as teaching programs in the classroom or gymnasium. As these programs developed, the need for medical *service* grew more obvious and there has been an increasing emphasis on the student service function which we have come to call student health service. In many colleges this *service* aspect of student health work has come to dominate the entire health program. It seems to me that we may predict a swing in the direction of education to the point where our programs maintain a better balance between health service and health education. We are all members of the faculty of educational institutions and our primary loyalties are educational. It is easy for those of us doing classroom teaching in hygiene to remember that we are "—one of a faculty assembled—," it should be easy for those of us working in the gymnasium to remember our educational opportunities, but it is often more difficult for the college physician working in a busy dispensary or infirmary to remember that he has teaching obligations. We should never forget that opportunities for instruction in matters of health permeate every activity of this student health program, whether for groups gathered in the classroom or on the gymnasium floor, or for ill individuals seen in the clinic or infirmary.

We are dealing with intelligent and educable young people whose knowledge of health and preventive medicine may or may not be equal to their knowledge of the classics, social or biological science, but our teaching opportunities in the area of hygiene are superior to those in other areas. Students may have indifferent interest in the classics or in biology but all students are interested in their own physical and mental well-being. Dr. Rogers[1] has remarked that " . . . the best teacher of hygiene is the master and not the servant of that body of tradition which passes for 'science' in his day." But this mastery of his medical science is not enough for the college physician. He must also master the many techniques of teaching. In short, he must interpret his scientific knowledge in a simple and practical way in order to make the most of his teaching opportunities. These opportunities are so unique that they merit the envy of the classroom teacher in other subjects. Our teaching is done by a combination of the classroom and clinic method whereby the learner is at once the object of the

*Presidential address, nineteenth annual meeting American Student Health Association, New York City, December 29, 1938.
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demonstration and the beneficiary of the method. What could be more ideal? How much simpler the teaching of mathematics would be if, each time the student learned a new equation he could be relieved of a distressing physical condition! How much simpler would be the English teacher's job if students consulted him with the same motives of personal concern and the same receptiveness to instruction as they have when they consult the college physician!

Osler has said that, "Medical progress will be made hand in hand with public information on medical subjects." This statement was never more true than today. There was a time when patients knew little concerning the nature and cause of their ills and depended implicitly upon the guidance of their physicians. People nowadays must be told the how and wherefore of their conditions and must know what medical science can do for them. The public no longer accepts medical science as something mysterious, nay, many people consider their own knowledge of their ills superior to the tenets of orthodox medicine. These changes in public information on disease processes and the growing emphasis on disease prevention require that the doctor be not only a competent clinician but also a competent teacher. This is true particularly of the college physician. Dr. Ray Lyman Wilbur[2] in his recent book *The March of Medicine* has said, "The doctor who guides normal people to continued good health will have to look at his patient from the standpoint of sound hygiene rather than as the receptacle of a disease that needs to be driven out." It happens that the physician's training of the past has been more concerned with ministration than with education. The techniques of ministration are still essential and might have been sufficient for the horse and buggy doctor, but contemporary lay medical knowledge requires the modern doctor to use also the techniques of education.

Health knowledge of the college student is naturally a lay knowledge, largely a reflection of the health information of his parents and whatever he has happened to learn in school. This usually consists of scattered facts of hygiene and a considerable amount of health misinformation. To fill in the gaps and to integrate sound health information, to correct faulty beliefs, to cultivate an interest in personal and community health problems and finally to help the student toward sound health attitudes; these are the tasks, yes, the opportunities of the college physician. Unfortunately, we college physicians find ourselves approaching this task with little educational equipment. We bring to the job a sound medical background, an ability to diagnose and treat, and a desire to instruct. Medical knowledge is essential, medical art is indispensable, but we must learn educational method. The fullest educational capabilities of the college physician are brought out when he has an opportunity to apply his skill and art in the matter of diagnosis, treatment and advice to the individual in the clinic or infirmary, an opportunity to observe the progress of educational research and an opportunity for classroom teaching.

Educational Opportunities in Classroom Teaching of Hygiene

It is fascinating to witness the emergence of public interest in matters of health and it is satisfying to realize that our opportunities for health education have increased in direct proportion to this growing interest. For many years this development was slow but recent trends in social consciousness of medicine and public health have stimulated the growth process. Francis Bacon found discouragingly few people interested in health in his time. He estimated that only one person in three thousand showed any interest in hygiene and as Rogers[1] has expressed it, most of these were "persons about to pass out of existence." Courses in hygiene have been taught in our colleges for many years. Rogers states that, "A hundred years ago all of the State teachers colleges and all of the colleges for women were doing what they could by way of furnishing instruction in health to their students." But very few colleges of other types were offering such instruction. Fifteen years ago Storey[3] reported that 57 per cent of a group of state colleges and universities and a larger per cent of other types of colleges were carrying required courses in hygiene. In the American Youth Commission study[4] (1935-36), we found that two-thirds of state colleges and universities, all teachers colleges and 80 per cent of privately endowed colleges were giving courses in hygiene. The number of courses offered in each college and the number of areas covered had increased appreciably since Storey's study. Apparently we are on the way toward the universal adoption of hygiene teaching in every college curriculum.

It is interesting to note the changing content in these courses. Early emphasis was largely upon matters of personal health and the general material covered was quite elementary. Modern courses stress the biological basis of personal hygiene and place more emphasis upon preventive medicine and community health problems. These courses are being developed in accordance with advances in educational research and the materials and methods are becoming more clearly defined. The two conferences on College Hygiene and the work of this Association's Committee on Informational Hygiene have had much to do with modern advances in hygiene teaching. But there is still much opportunity to prepare more detailed information in regard to content and method and to consider more careful evaluation of materials. These are tasks which the Committee on Informational Hygiene of this Association has set for itself.

Opportunities in classroom teaching are not limited to service courses for the general student body. Most colleges now are offering special courses for students in professional schools. Such courses have been recommended as part of the required curriculum in dental schools by the American Dental Association. They are being given in the majority of schools of nursing. More should be given in schools of theology. Storey reported that only seven out of one hundred such schools were giving hygiene courses. Rogers last year found that still only seven offered the subject. It is very encouraging

to note the increasing interest expressed by teachers in the lower schools in this subject of hygiene. It is encouraging also to note the increasing number of students being trained as hygiene teachers in our colleges. This increasing interest of teachers in the elementary and high schools is very gratifying to those who are hoping for the broader dissemination of information on matters of health. We may well anticipate that college students will come to us with a much broader foundation in health knowledge as a result of better teaching in the lower schools. This hope will be realized sooner if we as an association emphasize the importance of teacher training in hygiene and if we give support to the work of other organizations such as the American School Health Association and the American Association for Health, Physical Education and Recreation, a new department of the National Education Association.

In many colleges the classroom teaching program is being carried by physicians who are also carrying clinical responsibilities in the health service and infirmary. These individuals are well equipped with medical information and are completely absorbed in the welfare of students. Usually they have had little educational training, usually also they are doing fine educational jobs, though they would hesitate to admit it. Educational opportunities are best in colleges where these physicians are conducting both clinical and teaching assignments. This combination of duties works to the mutual benefit of both the clinic and classroom. The doctor brings to the classroom his clinical experiences and a practical knowledge of the needs of students who call upon him in his office. He returns to the clinic with methods of teaching that work to the advantage of ill students who come under his care. This reciprocal relationship should be cultivated. It brings both scientific integrity and animation into the classroom and it brings better educational method into clinic practice and to the bedside of ill students.

EDUCATIONAL OPPORTUNITIES IN HEALTH SERVICE

I doubt if many of our college physicians who work daily with the medical problems of students would consider themselves as teachers. Yet they could be teachers of the first order if their programs were fitted to the purpose. Individual instruction cannot be accomplished in a hasty interview. It is unfortunate that in some of our colleges the dispensary type of medical practice has come to dominate the health program. The organization of the physician's work and lack of assistance may result in "swamping" him with clinical problems. I am often reminded of Dr. Smiley's remark that "Nothing is more pitiful than to see one lone health service physician attempting complete medical care for a large student body." How many unequalled opportunities such a man is missing because he is denied time for leisurely counsel with his student patient. How much sound health instruction is denied his patient because his doctor has time to diagnose and prescribe but no time to prognose and describe. I am distressed on occasion when during a subsequent contact with a student I find that a more leisurely former interview and a few words of explanation might have changed a faulty attitude or prevented an unfortunate medical situation.

At this point and in the way of seeking a solution to the problem of over-emphasis on student medical service, I am taking the liberty to quote from a letter sent by one of our most experienced representatives to a member of the Informational Hygiene Committee. It reads as follows: "It would be nice if I were wise enough to see any clear attack upon this very basic and important problem of hygiene instruction in colleges. I suppose there is no particular value in my giving vent to the opinion that we would be in a better position if colleges, over the years, had been devoting their energy to this problem rather than dissipating it on many forms of inadequate medical service to students."

In this same connection may I quote from the College Health Study of the American Youth Commission: "The quality of work in student health services is measured by diagnostic equipment sufficient to meet the needs of the local college situation and by a medical and nursing staff adequate to use this equipment as a means of protecting and instructing students in matters of health."

Educational opportunities in classroom hygiene are obvious but the opportunities for health instruction in the health service and infirmary have been assumed more than they have been described. It seems desirable, therefore, to point out a few of the occasions in health service work when the physician may serve in fine capacity as a teacher. The educational value of the college health examination has rarely been defined in terms of its health educational value to the student. It is unfortunate that these examinations are often conducted on a mass basis wherein the student rushes from one examiner to another, goes through various maneuvers and comes out with some information about his various pieces but little orientation as to how his "whole" has fared. There is little educational value in such a procedure unless the student is given a chance to learn something of its purpose and his outcome. In our zeal to find physical defects we may overlook the fact that the "normal" student deserves to learn that he is "normal." He deserves the assurance that he has no obvious defects or health handicaps. Thus the health examination can be made a fine educational instrument for students without significant defects. The best educational opportunities are presented in the health examination of a student with obvious physical defects. Such students deserve an explanation of the nature and severity of their troubles, their influence on present and future health, the probable cause and possible course. They should learn when and how the defect should be corrected, where to secure the appropriate medical care, the probable cost and the probable outcome of treatment. They should be guided in learning to live happily with defects that are not remediable. Are these not sound, indeed, essential, educational devices?

Interpretation of each item in the physical examination has its own specific educational value. As an example, we might consider the matter of deviation from

standard weight, indicating that appropriate weight is more dependent upon inheritance and body build than upon any prescribed standard. We might discuss vision defects in terms of their anatomical or physiological causes and psychological results. This might well lead into a discussion of the relative merits of people doing visual corrective work; the ophthalmologist versus the optometrist versus the optician versus the jeweler, etc.

I cannot resist the temptation to describe three items in the health examination which are particularly rich in educational values. A recent article on rheumatic heart disease by Hedley has impressed me with the educational implications of heart disease as we see it in student clinics. Most people have an innate fear of heart disease and college students are no exception. Much psychological damage is done in our health examination program when the medical examiner expresses special interest or concern in the discovery of a heart murmur. Records of heart murmurs should be written and not spoken. Our interpretation to the student must be prefaced by careful examination of the heart and of the student's personality and both must be considered in his instruction.

Health education should acclaim two recent outstanding victories and the same techniques involved in these victories should be used in the solution of other educational problems. Not many years ago tuberculosis was called the white plague, a disease of the slums, almost always fatal, a disease of sinister and galloping proportions. But thanks to the development of modern diagnostic and therapeutic methods, we have learned its means of attack and how it can be discovered in early stages. Furthermore, it has been possible to popularize these methods of early discovery. It has taken a number of years of educational effort to spread the news of modern case-finding, and we may state proudly that college health workers have taken a lead in this campaign. The work of the Tuberculosis Committee of this Association first under the chairmanship of Dr. Ferguson and now under Dr. Lyght has led to an ever clearer picture of tuberculosis in college students, but in addition it has stimulated student interest in the subject. Studies have revealed the incidence of the disease in college groups throughout the country but, more important, they have led to the early care of thousands of young people in college with active disease. The educational value of this program is evidenced by the number of students who come to our student health services daily asking for the tuberculin test. They are usually fully informed concerning the test and other techniques involved in diagnosis and therapy. Such progress is indeed a tribute to health education.

Until recently the words "syphilis" and "gonorrhea" appeared rarely except in the scientific articles. The stigma attached to these "social" diseases has been largely removed and for this we are grateful to the courageous work of the Surgeon-General, to the efforts of the Social Hygiene Association, to general public education and to college hygiene instruction. Sound, informative articles appearing in the lay press have led the way toward rational discussion of the subject. We have noted the change in the student press. But most important we have noted increasing numbers of students reporting to our health services for serological tests either because of interest or exposure—but in either case—welcome. This is indeed a victory for health education.

The educational opportunities presented by our contacts with students in the student clinic and infirmary cannot be overemphasized. A student visit to the clinic or a doctor's call on an ill student in the infirmary may often be the occasion for discussion of health matters which carry the student far beyond classroom lectures on the subject. Diehl[6] has said, " . . . the most effective health instruction that we do is at the time when students come to us for medical advice, medical care or health examination. It is natural for college students, like the rest of us to be most acutely interested in health when there is a possibility of losing it." It is the old motto, used many times in other educational circles and coming to light again in the Progressive Education movement, "Strike while the iron is hot." A student has unusual opportunities to court instruction during a visit with the college physician, whether the purpose of his call be for diagnosis or treatment of a specific ailment or for medical advice on some general problem, or because of some difficulty with the administration or some emotional trouble. In the doctor's office or infirmary the student is exposed to other situations which have distinct educational value. He should learn the methods of a well-equipped physician working in a "model" office. He should learn something of the doctor's problems of diagnosis and therapy, he should learn what to expect of medical procedures and the value to him of seeking early medical attention. He should learn something about the use and abuse of drugs, and should learn to interpret medical articles and advertisements. He should learn how to discriminate between sound and unsound medical practice. We hope he learns the old adage that "He who is his own doctor has a fool for a patient."

You will note that I have spent much time in emphasizing the health service and infirmary as educational laboratories. I do not mean to create the impression thereby that their purpose is solely educational. They exist primarily for student service and as the college's agency to protect student health. We are all aware of their indispensable value as such. Without health service the student health program of many colleges would be deprived of a primary purpose, but if health service fails to carry its instructional obligations, then college health education will be robbed of a primary opportunity.

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The
JOURNAL LANCET

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American Student Health Association
North Dakota State Medical Association
South Dakota State Medical Association
Medical Association of Montana
The Sioux Valley Medical Association
Great Northern Railway Surgeons' Ass'n

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SURGERY IN THE NORTHWEST

This sixty-ninth anniversary issue of THE JOURNAL-LANCET is devoted to "Surgery". It carries thirteen original papers on a wide variety of surgical topics, ranging from "Actinomycosis of the Neck" to "Penetrating Wounds of the Knee-joint." In one respect, this issue is unique in the annals of medical literature. Every original paper comes from a surgeon who is actively practicing in North Dakota, South Dakota or Montana.

The publication, for the first time, in one special issue of a single journal, of a group of fine and progressive surgical papers from a section of the country which should have a wider reputation as a medical center, is fraught with significance. It is in the first place evidence stronger than propaganda of the high quality of medical service actually available to the people of the United States even in a part of the country where the density of population is less than five people per square mile.

Secondly, it is testimony to the surgical skill and judgment of men who are practicing progressive and intelligent surgery in a part of the United States which many people still consider the "great open spaces." We are reminded that the skill of a surgeon is in no way related to the size of the community in which he practices. This lesson has been brought home to the American public in the recent and justly popular book, "The Horse and Buggy Doctor," by Arthur Hertzler, M.D., of Halstead, Kansas. The active courage of American pioneers must remain part of the mental equipment of every successfully practicing surgeon.

Finally, this issue of THE JOURNAL-LANCET may stand as proof to more populous sections of the United States that men in the lesser known towns in the great Northwest have practical contributions to make to the surgical progress of the world.

We do not believe in any such nonsense as "regional surgery." The art of healing knows no state lines nor national boundaries. The fellowship of surgery is world-wide. It is worth noting, however, that the practicing surgeons of the Dakotas and Montana can teach as well as learn from others. The three states from which we have drawn our contributions to this issue were once included in what was known as the "Dakota Territory." There is significance in the name. It is derived from a Sioux Indian word "koda", of the Santee dialect, meaning an "alliance of friends." Such indeed is the philosophy that underlies the art of surgery.

We are proud to present to their colleagues in the "Flickertail" (North Dakota), "Coyote" (South Dakota), and "Bonanza" (Montana) states the contributions to surgical literature of men who are practicing among them. We are also pleased to be able to bring concrete evidence of these contributors to the rest of the United States.

R. C. W.

THEN AND NOW

Sixty-nine years ago teachers of surgery were content to explain the cause and advent of inflammation in the high-sounding but now meaningless terms: *ubi irritatio, ibi fluxus; ubi fluxus, ibi stasis; ubi stasis, ibi inflammatio.* Four mystical words were memorized as the classical signs of a local inflammation—*calor, rubor, tumor, dolor.* Pyogenic organisms were not known, but it was a well-established observation that an abundance of thick pus in a wound was a more encouraging sign than the thin exudate now known to be due to streptococci. It was therefore called laudable pus.

We shudder when told how the great Bigelow of Harvard used to keep a pus- and blood-bespattered Prince Albert coat at the hospital for wear in the operating room. It has been questioned whether an assassin or an instrument, in the hands of the great Agnew, probing the bullet-sterilized wound, was the cause of President Garfield's death. But this was before our present knowledge of infections. The microscope, radiology, and refinements in anesthesia have all contributed to make modern surgery what it is.

The red blood corpuscles were discovered by van Leeuwenhoek, yet little was known about the role of the leucocytes before Ehrlich and Metchnikoff announced their works on immunity. The former promulgated the side-chain theory, and the latter rested his case on pure leucocytosis. With the advent of bacteriology and a clearer understanding of the mechanism of disease resistance, inflammation was placed upon its present scientific basis. Antiseptic and aseptic techniques were born.

Osler gave a reception for Keen at the Baltimore Club in February, 1905. Keen spoke to the assembled guests on the changes that had taken place in surgery during his 50 years of practice. His climax came with these words: "As I look upon you young men, I am reminded of what Paul said to the centurion when he was cast into prison, 'Dost thou imprison a Roman without trial?'

"The centurion asked, 'Art thou a Roman?'

"Paul replied, 'Yea, I am a Roman born.'

"The centurion responded, 'At a great price obtained I that freedom.' " (Roman citizenship at that time could be purchased.)

"As I look upon you young men who live in this age of enlightenment, I am compelled to say that you are Romans born. At a great price obtained I that freedom."

A. E. H.

SIXTY-NINE YEARS

When one scans the thousands of pages of a file of the JOURNAL-LANCET for the past 69 years, he appreciates the role of the medical journal in keeping the medical profession abreast of the times. The JOURNAL-LANCET is only one of many medical journals which has always had the same high aims. In the pages of all these journals war has constantly been waged against disease.

Everywhere, the members of the medical profession have kept informed through medical journals and they have applied their knowledge with astounding results. Cholera infantum, diphtheria, typhoid fever and smallpox have been reduced to negligible proportions. Tuberculosis has been definitely reduced. Maternal and infant mortality have been markedly decreased. Numerous disease conditions of all parts of the body have been defeated by the surgeon. All of this has been largely responsible for increasing the span of life in the United States—from approximately forty years at the time of the Civil War to approximately sixty years at present—two thousand more years of living for each one hundred girls and boys, and living that is more enjoyable than ever before because of the decrease in distress and discomfort.

The medical profession has seen to it that the health of our poor citizens as well as that of the well-to-do and intermediate groups has been guarded. It has been estimated that in the United States alone, the members of the medical profession donate one million dollars worth of service daily in order that the needy may have adequate medical service. It has long since been expressed that the health of the people is the greatest asset of any nation. The high standing of the United States among the nations of the world is due in no small part to the accomplishments and services of the medical profession. One can scarcely pick up a newspaper or a popular magazine today without finding statements concerning the medical profession; some are appreciative while others are extremely critical. Such criticism is always present during times of financial stress even though the medical profession is in no way responsible for existing conditions. Despite comment and controversy, notwithstanding turbulence and argument, one fact stands steady and immutable—that through the years medical progress will continue. The scientific urge and the desire to aid the suffering is constant. Experiments will be performed, conclusions drawn and discoveries recorded.

One of the most valuable services that can be performed in the field of medicine is the maintenance of impartial journals for recording scientific opinion and practice. Such journals make a contribution to the generations in which they have their being. They offer a medium for the transmission of ideas and a forum for the discussion of procedure. No matter how many conflicting groups meet for parley, regardless what steps may be taken to socialize medicine, to revamp the national health structure, to induce special legislation or to "level off" medical activities, there will always be a continuous effort on the part of the profession to move forward in the prolongation of human life and on the part of professional medical journals, worthy of the name, an effort to spread the facts of this effort conscientiously and widely. On this *sixty-ninth* anniversary of the JOURNAL-LANCET, its Editorial Board and publishers pay tribute to those great physicians and publishers of previous years and decades, who perpetuated the journal and made it so worth while, and they now pledge themselves to continue these activities so as to make each succeeding volume of even more service to the medical profession and the good health of the public than the last.

J. A. M.

THE NORTH DAKOTA MEDICAL PRACTICE ACT

Several years ago, in order to make more effective that part of a law providing fines and imprisonments for impersonating a regular physician, a bill was introduced into the state legislature aiming to increase such fines and imprisonments for second and later violations. The bill was vetoed on the ground that it aimed at creating a medical monopoly, despite the fact that victims of irregulars had appealed on different occasions to the State Board for help to incarcerate the irregular "practitioners". One advertiser especially led the Board a merry race, without anything worth while being secured, until finally the Federal Government came into the scene; the man is now safely lodged for the next several years.

The North Dakota medical profession hope that during the current session of the legislature a suitable bill may be passed.

For comparison between the limited authority placed with the State Medical Board, as against heavier police powers permitted to some very subordinate, so-called *professions,* note the following North Dakota January, 1939, advertisement, from which some humor can well be developed:

"WARNING HAIRDRESSERS: The law fixes a penalty of One Hundred Dollars ($100.00) fine or ninety (90) days in jail *or both* for practicing hairdressing and beauty culture without a license. Acceptance of tips or other compensation by an unlicensed operator constitutes a violation. Persons knowing of violations, please notify the State Board of Hairdressers, 102 Bdway., Fargo, N. Dak."

A. W. S.

Book Reviews

The Treatment of Fractures, by CHARLES LOCKE SCUDDER, A.B., Ph.B., M.D., F.A.C.S.; 11th edition, revised with 1717 illustrations, 1208 pages; Philadelphia: W. B. Saunders Co.: 1938. Price, $12.00.

It has been twelve years since the publication of the previous edition of Dr. SCUDDER'S notable work on fractures, and this edition has been completely revised. One-third of the material presented in this book, covering special fracture problems, has been written by twenty other men actively engaged in the work of which they write. Fifteen of these contributors are from Boston. In reviewing this book, one is impressed with the influence of Dr. SCUDDER'S many years of experience as Chairman of the Committee on the Treatment of Fractures of the American College of Surgeons and the wide contacts which resulted from this position. The book is by no means provincial but is rather national in character. All of the various classes of fractures have been covered in as thorough a manner as space permitted, and modern approved methods of treatment have been described. Like many other textbooks on fractures, there was insufficient space devoted to fractures of the upper end of the tibia involving the knee joint. The special chapters on first aid and transportation, extension, skeletal traction, fractures of the vertebrae, surgical approaches to the bones, injuries to the intervertebral disks and methods of recording functional results are but a few of the many valuable features of this edition. There is a very useful chapter on the use of the fluoroscope. A chapter on surgical directions for the X-ray technician should, however, be included in every modern fracture text. One is impressed by the up-to-date, youthful and aggressive appearance of this book, first published in 1900 and now in its 11th edition.

Genital Abnormalities, Hermaphroditism, and Related Adrenal Diseases, by HUGH HAMPTON YOUNG, M.A., M.D., Sc.D., F.R.C.S.I., D.S.M., Professor of Urology, Johns Hopkins University; 649 pages; Baltimore: Williams & Wilkins Co.

From his wide urological experience, Dr. YOUNG has collected the results of comprehensive studies in the field of genital and adrenal abnormalities. This book is a fascinating presentation of a variety of genital malformations, with detailed descriptions of their embryologic development and the surgical procedures used in their correction. A complete survey of hermaphroditism is included, beginning with an interesting discussion of its historical aspects in the ancient literature and art. A chapter is devoted to prostate in females, the congenital malformation to which the author has directed much attention. In addition to his study of the adrenal-genital relationships, there is an accurate description of the writer's methods and procedures in adrenal surgery.

The entire volume is interesting reading for every practitioner and student, presenting many of the author's personal experiences in treatment of these unique genital and adrenal disorders. It is profusely illustrated by photographs, photomicrographs, and many of WM. P. DIDUSCH'S excellent drawings to emphasize Dr. YOUNG'S own procedures.

Management of the Sick Infant and Child, by LANGLEY PORTER, B.S., M.D., M.R.C.S.(Eng.), L.R.C.P.(Lond.), Dean, University of California Medical School and Professor of Medicine; and WILLIAM E. CARTER, M.D., Director; University of California Hospital Out-Patient Department; revised 5th edition, 874 pages; St. Louis: C. V. Mosby Co.: 1938. Price, $10.00.

This book presents the current accepted methods of treatment for most of the disturbances of infancy and childhood. One part is devoted to the management of symptoms, another to the actual disease entities, and the third to various therapeutic procedures. There is a wealth of information in every aspect of pediatrics carefully evaluated in terms of actual clinical experience. But apparently the findings of the pediatricians of the West are favored. A unique departure from most textbooks is the chapter on Behavior with pertinent conclusions for everyday practice.

Clinical Laboratory Methods and Diagnosis, Textbook on Laboratory Procedures with Their Interpretations, by R. B. H. GRADWOHL, M.D., director of the Gradwohl Laboratories; 2nd edition, 492 illustrations in the text and 44 color plates; St. Louis: C. V. Mosby Co.: 1938.

The first edition of *Clinical Laboratory Methods and Diagnosis* met with such a fine reception at the hands of reviewers and readers that it seemed necessary to revise this edition. The aim of the second edition of this volume is to eliminate the errors that appeared in the former edition and to delete any obsolete or impractical methods. Newer technics have been described and the literature has been brought up to date. Newer concepts of nephritis and nephrosis have been discussed in detail and the chapter on blood chemistry has been amplified and simplified. Whenever possible, standard modern methods are adopted and older or impractical methods are discarded. The chapter on symptomatology has been enlarged by over 100 pages and 24 full-page color plates have been added. The second edition of this volume can truly be looked upon as a veritable atlas of hematology. There is no doubt in the mind of the reviewer that the second edition of *Clinical Laboratory Methods and Diagnosis* should receive even a more extensive reception than that given the first edition.

Proceedings of the

Nineteenth Annual Meeting

of the

AMERICAN STUDENT HEALTH ASSOCIATION

Hotel New Yorker, New York City

December 29-30, 1938

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THURSDAY, DECEMBER 29

Session I

9:00 a. m.—Registration.

9:30 a. m.—Call to Order.

Secretary's Report—Dr. Ruth E. Boynton.

Reports of Local Sections—

Chairman, Dr. D. F. Smiley, Cornell University.

Report of Eye Health Committee—

Chairman, Dr. R. W. Bradshaw, Oberlin College.

Appointment of Nominating Committee.

Session II

10:30 to 12:00—General Session.

A. Committee on Health Service. *Chairman*, Dr. Ralph I. Canuteson, University of Kansas.

The Clinical Significance of Glycosuria—Dr. B. A. Watson, University of Minnesota.

Discussion opened by Dr. D. F. Smiley and Dr. A. B. Light.

B. Committee on Informational Hygiene. *Chairman*, Prof. T. B. Kirkpatrick, Columbia University.

Tentative Reports and Recommendations of the Committee.

C. Committee on Organization and Administration. *Chairman*, Dr. Helen B. Pryor, Stanford University.

An Evaluation of Health Service Procedures—Dr. W. E. Forsythe, University of Michigan.

Association Luncheon—12:30

President's Address—"Educational Opportunities in Student Health Programs," Dr. Charles E. Shepard, Stanford University.

Session III

(For purposes of round table discussions in Session III, the representatives gathered into six general groups, according to the type of institution they represent.)

2:00 to 3:30—Round Table Sessions.

Committee on Health Service. *Chairman*, Dr. Ralph I. Canuteson, University of Kansas.

Round Table No. I. Representatives from all state-supported and large endowed co-educational colleges and universities. *Sub-chairman*, Dr. H. D. Lees, University of Pennsylvania.

Round Table No. II. Representatives from all small endowed co-educational colleges and universities. *Sub-chairman*, Dr. J. Wilbur Armstrong, Berea College.

Round Table No. III. Representatives from Women's Colleges. *Sub-chairman*, Dr. Ruth M. Collings, Woman's College of North Carolina.

Round Table No. IV. Representatives from Men's Colleges. *Sub-chairman*, Dr. W. H. York, Princeton University.

Round Table No. V. Representatives from municipal colleges and universities having almost exclusive day school enrollments. *Sub-chairman*, Dr. Irvin W. Sander, Wayne University.

Round Table No. VI. Representatives from Teachers Colleges. *Sub-chairman,* Dr. A. O. DeWeese, Kent State University.

3:30 to 5:00—Round Table Sessions.

Committee on Organization and Administration. *Chairman,* Dr. Helen B. Pryor, Stanford University.

Round Table I. Representatives from all state-supported and large endowed co-educational colleges and universities. *Sub-chairman,* Dr. Ruby Cunningham, University of California.

Round Table No. II. Representatives from all small endowed co-educational colleges and universities. *Sub-chairman,* Dr. George T. Blydenburgh, Ohio Wesleyan University.

Round Table No. III. Representatives from Women's Colleges. *Sub-chairman,* Dr. Grace Hiller, Goucher College.

Round Table No. IV. Representatives from Men's Colleges. *Sub-chairman,* Dr. J. P. Ritenour, Pennsylvania State College.

Round Table No. V. Representatives from municipal colleges and universities having almost exclusive day school enrollments. *Sub-chairman,* Dr. F. A. Woll, College of the City of New York.

Round Table No. VI. Representatives from Teachers Colleges. *Sub-chairman,* Dr. Glenadine Snow, Michigan State Normal College.

6:30 p. m.—1938 Council Dinner.

FRIDAY, DECEMBER 30

Session IV

9:00 to 10:30—Round Table Sessions (A and B ran concurrently).

A. Committee on Health Service. *Chairman,* Dr. Ralph I. Canuteson, University of Kansas. *Discussion leaders*: Drs. Lees, Armstrong, Collings, York, Sander, DeWeese.

B. Committee on Informational Hygiene. *Chairman,* Prof. T. B. Kirkpatrick, Columbia University. *Discussion leaders*: Drs. Forsythe, DeKruif, Gould, Scott, Turner, Wood.

Session V

10:30 to 12:00—Round Table Sessions (C and D ran concurrently).

C. Committee on Organization and Administration. *Chairman,* Dr. Helen B. Pryor, Stanford University. *Discussion leaders*: Drs. Cunningham, Blydenburgh, Hiller, Ritenour, Woll, Snow.

D. Committee on Hygiene of Physical Education Activities. *Chairman,* Dr. Thomas A. Storey, Stanford University. *Discussion leaders*: Drs. Chenoweth, Howe, Kler, York.

12:00 to 1:00—Business Meeting.

Report of Council Meetings.

Report of Nominating Committee.

Report of Tuberculosis Committee. *Chairman,* Dr. Charles E. Lyght, Carleton College.

1:00 p. m.—Council Luncheon.

Session VI

2:30 to 4:30—General Session.

A. Committee on Hygiene of Physical Education Activities. *Chairman,* Dr. Thomas A. Storey, Stanford University.

The Hygiene of Physical Activities, Dr. Thomas A. Storey.

Discussion opened by Drs. York, Chenoweth, Howe, Kler.

B. Committee on Mental Hygiene. *Chairman,* Dr. Theophile Raphael, University of Michigan.

Mental Hygiene, Dr. Robert M. Fleming, Harvard University.

C. Committee on Eye Health. *Chairman,* Dr. R. W. Bradshaw, Oberlin College.

Eye Health of College Students, Dr. Anette M. Phelan.

Discussion opened by Dr. LeGrand Hardy.

D. Committee on Health Service. *Chairman,* Dr. Ralph I. Canuteson, University of Kansas.

Incidence of Syphilis, Dr. R. A. Vondelehr, U. S. P. H. S.

Discussion opened by Dr. Harry Eagle, U. S. P. H. S. and Dr. Ruth E. Boynton, Univerity of Minnesota.

Reports of Chairmen of Round Tables (10 minutes).

1. Health Service, Dr. Ralph I. Canuteson.
2. Informational Hygiene, Prof. T. B. Kirkpatrick.
3. Organization and Administration, Dr. Helen B. Pryor.

FINANCIAL STATEMENT

December 31, 1938

Receipts

Balance brought forward		$1,560.85
1938 dues from 154 members		1,540.00
1936 dues from 1 member		10.00
1937 dues from 2 members		20.00
1939 dues from 8 members		80.00
Proceedings sold—36 at $1.75		63.00
		$3,273.85

Disbursements

Subscriptions to JOURNAL-LANCET (159)		$238.50
Postage, Secretary's office	$70.00	
Postage, Dr. Lyght's Committee	20.00	
		90.00
Honararium to Father Schwitalla		20.00
151 copies of Proceedings of Second National Conference on College Hygiene		75.50
500 Reprints of Father Schwitalla's address		19.50
Dr. Smiley's expenses to National Health Education Meeting		19.10
Secretarial Help		50.00
Exchange		4.20
Refunds to Sections:		
Indiana	$10.00	
Mid-Atlantic	35.00	
Michigan	22.50	
New York	42.50	
North Central	30.00	
Pacific Coast (NW)	15.00	
Ohio	35.00	
Pennsylvania-New Jersey	45.00	
Rocky Mountain	7.50	
Southern	17.50	
South Central	25.00	
Southwestern	17.50	
		302.50
Stationery and printing, 1938:		
Letter heads, envelopes, programs		47.15
1937 Proceedings:		
375 copies	$361.25	
Boxes and labels	41.00	
Postage and express	21.63	
		423.88
Convention expense:		
Council dinner and luncheon	$59.33	
Tips, tax, telephone	16.64	
Rental of projector	8.00	
Travel expense, Secretary	92.55	
		176.52
		$1,466.85
Balance		1,807.00
		$3,273.85

RUTH E. BOYNTON, M.D.,
Secretary-Treasurer.

BUSINESS MEETING
Thursday, December 29, 1938
Report of the Secretary-Treasurer

The following report of the Council Meeting of December 31, 1937, was read and approved:

Mr. L. M. Cohen, manager of the JOURNAL-LANCET, was a guest of the Council for luncheon. At the request of Mr. Cohen, it was moved by Dr. Smiley and seconded by Dr. Forsythe that the Association make a three-year agreement with the JOURNAL-LANCET to continue this journal as the official magazine of the Association. Mr. Cohen stated that if at any time during this period, for any reason, the Association wished to discontinue this agreement with the JOURNAL-LANCET, that could be done.

It was moved by Dr. Ferguson and seconded by Dr. York that some of the detailed material on tuberculosis in colleges, which was presented before the Second Conference on College Hygiene but not included in the Proceedings of the Conference, be published. How this material should be distributed was referred to the Executive Committee. This motion was passed.

It was moved by Dr. Smiley and seconded by Dr. Canuteson that the President appoint a special committee to study the needs and possibilities of training student health workers, and also the possibilities for establishing exchange positions for people in student health work. Motion was passed.

It was moved by Dr. York and seconded by Dr. Bradshaw that the 1938 meeting be held in New York City.

The idea of establishing a special research committee in the Association was brought up by Dr. Cunningham and discussed by the Council. It was felt by several members of the Council that a special research committee at this time was not necessary. It was suggested by Dr. Smiley that the Editorial Committee might act in the capacity of a research committee. It was moved by Dr. Cunningham and seconded by Dr. York that this suggestion that the Editorial Committee act for this Research Committee, be carried out. Motion was passed.

The Secretary reported that there are a total of 148 member institutions in the Association, 145 of which have paid their annual dues. Applications for membership have been received from 18 institutions during the past year. During the year Battle Creek College, Battle Creek, Michigan, closed for an indefinite period and therefore withdrew from our Association.

Copies of the Proceedings of the National Conference on College Hygiene were sent to all member institutions. Reprints of the luncheon address given by Father Schwitalla at the 1937 meeting were mailed to all member institutions and to the officers of all of the local sections.

An honorarium of $20.00 was sent Father Schwitalla on vote of the Executive Committee.

REPORT OF THE NOMINATING COMMITTEE

The Nominating Committee, consisting of Dr. Ralph I. Canuteson, Dr. George T. Blydenburgh, and Dr. Fred Miller, presented the following ballot for officers of the Association for 1939:

President: Dr. Charles E. Shepard, Stanford University, Palo Alto, California.

Vice-President: Dr. W. H. York, Princeton University, Princeton, New Jersey.

Secretary-Treasurer: Dr. Ruth E. Boynton, University of Minnesota, Minneapolis, Minnesota.

Members of the Council for two year terms, expiring December, 1940: Dr. Ruth Collings, Woman's College of North Carolina, Greensboro, North Carolina; Dr. H. N. Kingsford, Dartmouth College, Hanover, New Hampshire; and Dr. Dan G. Stine, University of Missouri, Columbia, Missouri.

This report was accepted and the secretary instructed to cast an unanimous ballot for these officers.

BUSINESS MEETING
Friday, December 30, 1938
Report of Council Meeting:

The following report and recommendations of the Advisory Council Meeting of Thursday, December 29, 1938, were received and approved:

The Council discussed the admission of junior colleges to membership in the Association. It was the opinion, after much discussion, that junior colleges should be admitted to the Association, as any other college may be after each college has been considered individually.

A suggestion made by Dr. Dan Stine, University of Missouri, that the American Student Health Association consider urging approval of student health services for certification of residence physicians was discussed. It was the opinion of the Council that, since the type of health services vary so greatly, it would be unwise for the Association to take any action on this question. It was felt that individual student health services might take the initiative for their particular schools if they so wished.

The question of the American Student Health Association publishing its own Journal was discussed. The suggestion was made with the idea that many papers presented at local sections were worthy of publication. It was pointed out that the JOURNAL-LANCET is glad to publish as many papers as the Association presents, so that papers from local sections may be published in the JOURNAL-LANCET. During the discussion it was brought out that publication of a separate Journal would be very much more expensive than using the JOURNAL-LANCET, and also obviously would require much more time on the part of some member of the Association. The Council voted that the Secretary write a letter to the local sections requesting them to send outstanding papers to the Editorial Committee of the American Student Health Association for consideration for the JOURNAL-LANCET.

Dr. Smiley reported on the meeting of the Health Education Conference in New York, December 4 to 7. Dr. Charles E. Shepard asked Dr. Smiley to represent the American Student Health Association at this conference. It was moved by Dr. Ferguson and seconded by Dr. Storey that Dr. Smiley's expenses of $19.10 be paid by the Association. Motion was carried.

Dr. Charles Shepard commented on the recent celebration at the University of Michigan of the twenty-fifth anniversary of the establishment of the Student Health Service. The Executive Council voted to commend the leadership of the University of Michigan in the development and progress in student health work.

The Council voted to ask members of the Association to participate in the observance of National Social Hygiene Day on February 1, 1939.

The Secretary read a letter from the American Council on Education inviting the Association to join the American Council on Education as an associate member. The annual membership fee is $10.00. After some discussion, during which it was pointed out that the American Council on Education has been interested in furthering knowledge on student health work through the American Youth Commission, it was moved by Dr. Smiley and seconded by Dr. Bradshaw that an associate membership in the American Council on Education be taken for one year.

The Council recommended that membership be granted the following institutions:

Colby Jr. College for Women, New London, N. H., Dr. William P. Clough, Miss Viola G. Pfrommer.

Idaho, University of, Moscow, Ida., Dr. Harold D. Cramer.

Illinois, University of, Urbana, Ill., Dr. J. Howard Beard.

Knox College, Galesburg, Ill., Dr. B. D. Roberts.

Long Island College of Medicine, 350 Henry St., Brooklyn, N. Y., Dr. M. B. Handelsman.

Loyola University, 706 S. Lincoln, Chicago, Ill., Dr. Robert E. Lee.

Medical College of Virginia, Richmond, Va., Dr. Fred J. Wampler.

Northwestern University, Evanston, Ill., Dr. S. J. Lang, Dr. Mary Pope.

Oklahoma, University of, Norman, Okla., Dr. W. A. Fowler.

Platteville State Teachers College, Platteville, Wis., Mr. Fred T. Ullrich.

Providence College, Providence, R. I., Dr. Frederic J. Burns.

Richmond, University of, Richmond, Va., Dr. Cullen Pitt.

Rollins College, Winter Park, Fla., Dr. Robert A. Wise.

State Teachers College, Duluth, Minn., Dr. A. O. Swenson.
State Teachers College, St. Cloud, Minn., M. Elizabeth Barker.
State Teachers College, Valley City, N. D., Miss Mercedes Weiss.
State Teachers College, Winona, Minn., Dr. G. E. Galligan.
Virginia, University of, Box 1745, University, Va., Dr. Andrew D. Hart, Jr.
Wichita, University of, Wichita, Kan., Clinton G. McDonald.

RUTH E. BOYNTON, M.D.,
Secretary-Treasurer.

Societies

SCIENTIFIC PROGRAM OF THE MINNEAPOLIS CLINICAL CLUB

Meeting of November 10, 1938
E. S. Platou, M.D., Presiding

THE SIGNIFICANCE OF ENDOMETRIAL CHANGES IN MENORRHAGIA

CHARLES H. MCKENZIE, M.D.
MINNEAPOLIS, MINN.

In a review of the cases of "menorrhagia", and of "menorrhagia and metrorrhagia" treated at the University Hospital from 1934 to 1937 inclusive, two groups are of interest because of the endometrial pictures presented.

1. *Cystic glandular hyperplasia of the endometrium* (endometrial hyperplasia, Swiss cheese pattern of endometrium, metropathia hemorrhagica): There were 17 cases presenting this abnormal picture at diagnostic curettage. Four women were under 28 years of age, 13 between 28 and 52 years of age, and of these latter, 10 were over 35 years of age. Cystic glandular hyperplasia tends to be a condition of the beginning and end of reproductive life, more commonly toward the end.[12]

The histologic pictures vary slightly in the endometrium obtained from each patient but all show the typical changes in glands and stroma. At curettage, abundant amounts of endometrium are obtained. In section, the stroma gives the impression of compactness and abundance. It appears to be in active growth, for mitotic figures are seen. The nuclei are darkly stained. Throughout the stroma many blood vessels are seen, the arteries often thrombosed and the veins dilated. The glands are irregular in size and shape, some being relatively enormous. The gland cells are columnar and the epithelium tends to pile up, producing multiple layers. The whole picture is that of a persistence and exaggeration of the proliferative phase of the normal menstrual cycle. The stroma resembles that of the proliferative phase in its compactness but appears in greater abundance. The glands, too, are of all sizes, some resembling small cysts. The epithelium of the glands is crowded together and tends to pile up in contrast to the gland cells of the proliferative phase. The endometrium appears uniform throughout, and is not differentiated into the three layers of the secretory phase—compacta, spongiosa and basalis. The endometrium does not desquamate as in normal menstruation. The bleeding comes from the areas of thrombosed vessels, *i. e.*, from necrosis of sites of impaired circulation, or because of increased permeability of the endometrial vessels.

This persistence of the proliferative or postmenstrual phase has been shown by Schroeder, Burch and others to be due to an excess of the follicular hormone, estrone. It has been noted many times also, that the ovaries of patients with cystic glandular hyperplasia of the endometrium contain follicular cysts and do not show signs of recent ovulation or of corpora lutea. Burch[3] and Novak[12] believe that there is an imbalance of the gonadotropic hormones of the anterior pituitary glands, that is, that ovarian failure is secondary to anterior pituitary failure. No records are available as to the pathological findings in the anterior pituitary in women with cystic glandular hyperplasia of the endometrium.

Malignant disease of the uterus is always to be suspected with irregular bleeding. However in an analysis of 534 cases of cystic glandular hyperplasia of the endometrium in women before the menopause, Payne[13] found cancer of the uterus associated with this condition in only 1.8 per cent. It would appear that the association was entirely coincidental, and that cystic glandular hyperplasia does not predispose to cancer of the uterus.

The condition may disappear spontaneously and the patient return to a normal menstrual cycle. This occurred after curettage in two of the patients, ages 28 and 31. Two patients, ages 16 and 18, had B.M.R. —11 per cent and —19 per cent respectively. On thyroid therapy, they had irregular menses but with less bleeding. They had a return of menorrhagia and metrorrhagia when they discontinued thyroid medication. Treatment has also been directed toward stimulating the ovary or the endometrium by endocrine products. Novak, Burch and others were able to stop excessive bleeding by the luteinizing hormone, Prolan B (A.P.L.) in many cases, but there are also reports of failure of this therapy.[7] There are several recent reports, too, on the successful use of progesterone for the control of menorrhagia due to cystic glandular hyperplasia of the endometrium.[2,16,9]

Eventually, since the condition is due to hormonal imbalance, the treatment will be hormonal. But for the present, particularly in the older age group, radiation therapy in sterilizing or substerilizing dosage continues to give best results. Seven patients, over 37 years of age, were given radiation therapy. There is no follow-up of three patients; three patients reported persistent amenorrhea and the seventh patient reported return of normal menses in sixteen months.

2. *Irregular Shedding*: Another cause of menorrhagia has been described by Traut and Kuder[15] by the term "irregular shedding."

"The curettage material showed wide variation in the thickness of the mucosa and the size of the various pieces of endometrium." The histological picture is definite and characteristic. "The stroma is shrunken and composed of many deeply basophilic spindle-shaped nuclei. The spiral arterioles vary somewhat but usually are dilated and engorged. Occasionally, but particularly in those who have bled for some time, there are thromboses of these vessels. In some cases there is extravasation of the blood elements into the stroma. The glands of the peripheral portions of the endometrium are collapsed to form bizarre shapes, many of them suggesting three, four or five-pointed stars. The epithelium is obviously in the secretory or corpus luteum phase, as nuclei of the cells are discrete and located at the base of the cells, while the cytoplasm is clear though low, and irregular in outline, suggesting prolonged activity. Other glands may show little or no secretory activity. But for the most part the impression gained by a study of the tissue is that it is predominantly a secretory membrane. This should serve to distinguish it from hyperplasia, which is just as markedly nonsecretory or proliferative in type."

They consider the menorrhagia simply a prolonged menstrual period. "All the histological evidence seems to point toward a prolonged and weak corpus luteum effect." They present 11 patients with the condition, between the ages of 23 and 50, with normal pelvis and no constitutional disease, who had had prolonged and profuse menses. All but one were cured by curettage, one patient having a return of the same condition.

So far only two histological pictures of the endometrium corresponding closely to the above description and to microphotographs in the original article have been noted.

A 39-year-old woman, para VI—grav. VI, had profuse and irregular menses for one year prior to admission. She had hypertension, B. P. 200/140, a nontoxic adenoma of the thyroid, and was a mild diabetic. On January 7, 1936, curettage was done and the above endometrial picture obtained. She continued to have profuse menses in February and March and was therefore given a sterilizing dose of X-ray in March, 1936. She had mild menopausal symptoms for several months, but at last report was cured.

The second patient, age 35, para II—grav. III, had profuse menses for six months following an abortion. A curettage was

done with no relief. A second curettage was done three months later and these curettings show "irregular shedding" of the endometrium. The uterus and adnexa were found to be normal at this time. The patient did not return and is presumed cured.

COMMENT

1. The histological pictures of the endometrium in a normal menstrual cycle depend on a balance between the ovarian hormones estrone and progesterone which stimulate the growth and changes in the endometrium.

2. Cystic glandular hyperplasia of the endometrium presents a picture of persistence and exaggeration of the proliferative phase and is due to prolonged stimulation by the follicular hormone, estrone.

3. Irregular shedding of the endometrium presents a picture of a prolonged secretory phase and is considered to be due to a prolonged weak stimulation of the corpus luteum hormone, progesterone.

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DISCUSSION

Dr. E. T. BELL: I have tried a great many years to get something out of curettements that would be helpful to the gynecologists in guiding their therapy, but after making perhaps several thousand examinations, I must admit I cannot help them very much. I think we can say that not over one-third of the curettements which we see afford an anatomical explanation for the bleeding. Probably in two-thirds of the cases the bleeding is due to physiological disturbances which are not understood at present. At the present time we have a rather complete knowledge of the way the hormones work on the uterus. We know what estrin will do. Estrin comes from the ovarian follicles and causes the hypertrophy of the endometrium. Immediately after menstruation the endometrium is very thin. Before puberty and after the menopause, the uterine mucosa is very thin; there are only a few small dark glands. After castration, no matter how that is done, a similar atrophy develops. The removal of the ovaries or destruction of the ovarian follicles causes complete atrophy of the endometrium. In the rodents which have been experimented on a great deal with these hormones, removal of the ovaries causes the endometrium to regress to the prepuberty stage. If you inject estrin into the castrated rodent, the endometrium hypertrophies, but it will not attain the premenstrual stage unless progestin is then injected. The cycle may be reproduced in rodents by using these ovarian hormones, but when we attempt to apply this knowledge to a patient we are usually unsuccessful. Progestin will seldom convert the proliferative into the premenstrual mucosa. It is commonly believed that the hypertrophic endometrium is due to an excess of estrin, since it may be produced in animals in this way. Sometimes the bleeding may be controlled by curettage, but often more drastic measures are necessary to control severe bleeding. In spite of our knowledge of the action of the ovarian hormones, we cannot use them practically in the control of dysmenorrhea. By examination of the curettement, we can determine whether malignancy is present, and whether there is retained placental tissue. We can diagnose the cystic hypertrophic endometrium. But perhaps two-thirds of the endometria show a normal proliferative phase and give no explanation of the bleeding.

Membranous dysmenorrhea is a clinical as well as a pathological entity. Clinically there is severe prolonged painful menstruation and pieces of endometrium are found in the menstrual blood. Sometimes a uterine cast is discharged. Severe anemia may develop. Microscopically there is a marked decidual reaction in the stroma so that the resemblance to decidua may be striking. There may be confusion with ectopic pregnancy. No satisfactory explanation of membranous dysmenorrhea is available.

Fibrosis uteri was formerly supposed to be a cause of uterine bleeding, but we have learned that the replacement of the uterine muscle by fibrous tissue is a change related to age, and that it is just as prominent in women who do not bleed as in those who bleed. The gonadotropic hormones affect the uterus. I recently studied a case of extragenital chorionepithelioma in which the uterine mucosa resembled that of pregnancy. When over one tablespoonful of tissue is obtained at curettage, one may say that it is either a premenstrual mucosa or a diseased endometrium. If you can scrape only a few shreds of mucosa from the uterus, you are not dealing with carcinoma.

Dr. H. M. N. WYNNE: I wish to congratulate Doctor McKenzie on this work which represents many hours of tedious and exacting labor. I feel sure that the report has been of value to both Doctor McKenzie and the Clinical Club.

Secondary anemia was surprisingly absent in this series. Menorrhagia extending over a period of months or years may cause a high grade of secondary anemia. It is not rare to find the hemoglobin from 40 to 60 per cent.

Chronic cervicitis as a possible cause of menorrhagia should be considered but there are certainly a great many women who have normal menstruation and a severe chronic cervicitis. I believe that retroversion of the uterus as a cause of menorrhagia except following childbirth is rather rare. Estimation of the size of the uterus by palpation alone is not accurate. The thickness of the abdominal wall and the degree of relaxation of the abdominal muscles make accurate estimations difficult; however, with the additional help of the measurement of the depth of the uterine cavity a fair impression of the size can be gained.

A basal metabolic rate is important in cases of functional bleeding. Thyroid therapy will often correct the abnormality in patients who have a low basal metabolism. The anterior pituitary-like hormones have a value for temporary relief during heavy bleeding when administered intramuscularly in doses of three cubic centimeters daily; however, I have been disappointed in obtaining permanent results. Progesterone should be of great value but my experience has been too limited for me to venture an opinion from its use.

Doctor Bell spoke of diagnostic curettage as a method of ruling out carcinoma. I believe this to be true provided the operation is done with care. The entire uterine cavity must be scraped with particular attention given to the top of the fundus and cornua. A curettage preceding a hysterectomy should be checked by opening the uterus as soon as it is removed. The operator will often be astonished to find how few marks of the curet will be found in the fundus.

Radiation with radium or Roentgen rays must be used with exceptional care if we wish to avoid an artificial menopause. Hysterectomy with preservation of the ovaries is often preferred by physicians who have had much experience in treating women suffering from an artificial menopause.

Dr. MCKELVEY'S Discussion: Dr. John L. McKelvey, guest of the club, pointed out that he was unable to agree with Dr. Bell's opinion that a diagnosis of a pathological change could

be made in only one-third of the specimens routinely encountered. He stated that it must be borne in mind that not all bleeding is due primarily to lesions in the endometrium itself, but that manifestations of extra-endometrial pathology can be recognized by careful study of the endometrium. Edema and vascular congestion was described as an example of this.

Referring to Dr. McKenzie's description of the morphology of the endometrium in cystic glandular hyperplasia, Dr. McKelvey reminded the members that not all tissue obtained at curettage in this disease showed the classical picture. Various stages in shedding and regeneration following the bleeding phase were described. Basal hyperplasia, generalized and circumscribed, were also described.

A plea was made for more accurate microscopic study of the curettage material, with the prospect of more accurate diagnosis.

Dr. E. T. BELL (Replying to Dr. McKelvey): I do not want to engage in a rebuttal with Dr. McKelvey; I only said that I can't tell why most endometria bleed. I do not think that the cause of the bleeding can be determined in over one-third of the cases from examination of the curettings, but I should be glad to hear Dr. McKelvey explain how he does it. Congestion and hemorrhage in the stroma are present in almost every instance. I cannot see that this feature has any diagnostic significance. The pathologist may call attention to features such as cystic glands, areas of focal necrosis and small polypi; but the clinical interpretation of these alterations is difficult.

Dr. C. J. EHRENBERG: After all, the bleeding of menstruation comes from the spiral arterioles in the decidua compacta, and at the present time the exact relationship of menstrual bleeding to endometrial changes is not known. As Carl Hartmann has pointed out, the observations of hormonal effects on the endometrium have led the study of the physiology of menstruation up a blind alley. If this is true of normal menstrual physiology, it would seem to apply equally well to the abnormal, as the information gained by the study of curettings taken at a single curettement is extremely variable in relationship to the various clinical pictures of disturbed menstrual bleeding.

The observations of Trant and Kuder, mentioned by Dr. McKenzie, from which they assume that the excessive desquamation associated with their menorrhagia cases is the result of overaction of progesterone is interesting when compared to the observations of Randall and Herrell and especially so if we assume that abnormal menstrual bleedings are closely related to the changes produced in the endometrium by the hormones. Herrell and Broders classified endometria much the same as was shown in Dr. McKenzie's diagram naming the four phases as early differentiative, late differentiative, early secretory and late secretory. Later Randall and Herrell, using endometrial biopsies correlated with concurrent estrogen and prolan assays, observed that prolonged estrogenic stimulation of the endometrium resulted in the late differentiative phase often with cyst formation but that abnormal bleedings occurred in inverse proportion to the amount of secretory phase present. They suggested that the secretory phase was dependent on the progesterone from the corpus luteum and that the first sign of ovarian failure was at this point. This suggests that as corpus luteum function continues to fail, the more apt abnormal bleeding is to occur. Here we have then two views diametrically opposed—one assuming that abnormal bleeding is due to overstimulation with progesterone and the other assuming that abnormal bleeding is due to under-stimulation with progesterone. The recent discovery of Venning and Browne of a method of determining the amount of pregnandiol (which is the metabolic residue of progesterone) in the urine may help to clarify this situation. I believe the study of repeated endometrial biopsies when correlated with concurrent assays of estrogen, prolan and pregnandiol, may, when sufficient observations have been made to establish normals, lead to a definite relationship between abnormal uterine bleeding and the endometrial pattern.

A word might be added about the use of A.P.L. hormone in menorrhagia and metrorrhagia. There is now sufficient evidence to show that polycystic ovaries have resulted from the use of this hormone, and that it is not without some danger. Inasmuch as the effect to be hoped for is the luteinizing action on the endometrium, why not use direct substitutional therapy, with progesterone. Here is a chemically known product which will effect the endometrium but which will have no influence on the ovaries.

Dr. McKenzie noted the high incidence of cervicitis (66 per cent) present in this group of menorrhagia cases. He did not correlate this with the endometrial picture and I am wondering if any of these showed changes sufficient to call them abnormal. The peculiarities of the cervical lymphatics, the variety of the infecting organisms and the complex structure of the cervical glands would serve to give an extremely variable degree of lymphangitis which in itself could produce abnormal uterine bleeding without a change in the endometrial picture. Certainly, the simple treatment and cure of a cervicitis has given relief from menorrhagia many times in my experience.

Dr. H. B. SWEETSER, JR.: I had developed the idea that retroversion was no longer considered a cause by itself, of bleeding. If that is different now I wish Dr. McKenzie would tell us a bit more about it.

Dr. CHARLES H. MCKENZIE: I wish to thank all those who have taken part in this discussion. The findings in the endometrium of only 19 patients have been discussed. As Dr. Bell and Dr. McKelvey have pointed out, there are many other endometrial pictures and in the remaining slides, I have noticed many with marked edema of the stroma of the endometrium. This endometrium was obtained from patients with myomata of the uterus, retroversion of the uterus, and in one case from a patient with cardiac decompensation. Hormonal therapy will be of value, first, when we have some simple tests for the amount of estrone and progesterone in the blood and urine; and second, when the normals of each have been established. Then we may hope to correct any imbalance in these hormones by stimulating or substitutional therapy. The amount of radiation in all cases of bleeding is very difficult to determine. Many women have permanent amenorrhea, some have a return of a normal menstrual period, and a few are not benefitted. Again I wish to thank all those who took part in this discussion.

L. R. BOIES, M.D., *Secretary.*

NORTH DAKOTA STATE MEDICAL ASSOCIATION

NORTH DAKOTA DEPARTMENT OF HEALTH DIVISION OF CHILD HYGIENE

From the minutes of the meeting of the Maternal and Child Welfare Committee of the North Dakota State Medical Association, Maysil M. Williams, M.D., Secretary.

The Maternal and Child Welfare Committee of the North Dakota State Medical Association met in Grand Forks, December 17, 1938.

At this meeting the Committee approved plans formulated by the Committee Chairman, John H. Moore, M.D., Grand Forks, for the reduction of infant mortality in North Dakota. Dr. R. E. Pray has expressed his willingness to work out the details of this program.

In North Dakota about 5 per cent of the births are reported as premature. However, 30 to 40 per cent of the infant deaths are reported as due to prematurity. These facts emphasize the importance of an effective plan to reduce infant deaths due to prematurity.

The following aims were discussed and approved by the Committee:

1. The establishment of standards for hospital or home management and feeding of premature infants.
2. The installation of low cost incubators in hospitals in North Dakota, and the placement of incubators in other key spots in the state where hospital facilities are widely spaced.
3. The recommendation of standard techniques of resuscitation of the premature and newborn infants for all North Dakota hospitals.

4. The recommendation of a standard method of feeding the newborn for use in all North Dakota hospitals.
5. The establishment of standard and uniform maternity records in all North Dakota hospitals.
6. An educational program of seminars on the care of premature infants in the hospital centers of North Dakota to be conducted by pediatricians selected by the Committee.
7. Obtaining statistical data on causes of neonatal deaths in North Dakota, inasfar as resources permit.

The incubator, approved by the Committee, was assembled by the Chairman in personal collaboration with Dr. A. V. Stoesser of the University of Minnesota, the latter being the originator of the incubator.

The salient features of the incubator include automatic control of humidity and temperature. It is readily transportable, and is of durable construction. The incubator is being assembled with a mercury switch, as an added element of safety when oxygen is being administered. Fifteen hundred dollars has been contributed by one interested donor who wishes to remain anonymous. This gift is to be used to assist financially with the distribution of incubators. Dr. P. G. Woutat was selected by the Committee to act as Treasurer of the gift fund. These incubators are being assembled at the University of North Dakota under the direction of the Committee Chairman.

It will be noted the plan includes seminars to be conducted for nurses, physicians and interested lay groups in the hospital centers where the low cost incubators have been obtained. It was felt that this program would meet with the ready approval of the physicians of the state. The Committee further anticipates the willingness of the physicians to guide lay organizations in their participation in this program.

The present membership of the Committee on Maternal and Child Welfare of the State Medical Association consists of: John H. Moore, M.D., chairman, Grand Forks; J. L. Conrad, M.D., Jamestown; P. W. Freise, M.D., Bismarck; J. D. Graham, M.D., Devils Lake; J. F. Hanna, M.D., Fargo; R. E. Pray, M.D., Fargo; E. M. Ransom, M.D., Minot; P. G. Woutat, M.D., Grand Forks; M. D. Westley, M.D., Cooperstown; Maysil M. Williams, M.D., secretary, Bismarck.

Minnesota State Board of Medical Examiners

Julian F. DuBois, M.D., Secretary
St. Paul, Minnesota

DOCKET OF CASES

Mankato Physician's License Revoked

In the Matter of the Revocation of the License of ARTHUR W. ECKSTEIN, M.D.

The license to practice medicine and surgery held by Arthur W. Eckstein, M.D., Mankato, Minnesota, was revoked by the Minnesota State Board of Medical Examiners on December 16, 1938. Dr. Eckstein was found guilty by the Medical Board of "immoral, dishonorable and unprofessional conduct," and, specifically, with procuring, aiding and abetting a criminal abortion.

In 1932 Dr. Eckstein was before the Board on a similar charge and was reprimanded and placed on probation. In 1934 Dr. Eckstein pleaded guilty in the District Court at Mankato to the crime of abortion and was sentenced to two years at hard labor in prison. Upon his release he pleaded with the Medical Board for a chance to take the examination for a new license. Numerous physicians in Mankato endorsed him and a license was finally issued. Dr. Eckstein's first license was revoked in May, 1934.

In the present case Dr. Eckstein was seen on October 17, 1938, in the act of throwing a package over the Minnesota River bridge at Mankato. Subsequent investigation disclosed the contents as a fetus, with the head severed from the body. He was arrested on the next day charged with abortion. Eight witnesses testified before the Medical Board. The criminal case at Mankato has not been disposed of.

License of Lake City Physician Suspended for Five Years

In the Matter of the Revocation of the License of GOTTFRIED SCHMIDT, M.D.

The Minnesota State Board of Medical Examiners, on December 16, 1938, suspended for five years the license to practice medicine and surgery held by Gottfried Schmidt, M.D., Lake City, Minnesota. Dr. Schmidt was found guilty by the Medical Board of advertising "professional superiority to, and greater skill than, that possessed by fellow physicians and surgeons" and of "conduct unbecoming a person licensed to practice medicine and detrimental to the best interests of the public."

Numerous complaints had been received by the Medical Board as to the methods used by Dr. Schmidt in making a diagnosis and also in his manner of treating ailments. Letters also had been referred to the Board that were written and mailed by Dr. Schmidt, in his practice, to patients and others. These letters in the opinion of the Board are highly improper. Dr. Schmidt attempted to diagnose diseases by having the patient place some saliva on a piece of paper. Out-of-town patients mailed this paper to Dr. Schmidt at Lake City. He then proceeded to treat the patient by medicine sent through the mail. He also stated that he had a machine with which he could broadcast treatments.

Dr. Schmidt was admonished by the Board in 1936 to refrain from these practices. However, he persisted and the citation resulted. Dr. Schmidt was born in Minnesota in 1871 and graduated in medicine from the University of Minnesota in 1903.

Windom Osteopath Fined $250.00 for Practicing Medicine Without License

Re: STATE OF MINNESOTA *vs.* JOHN L. MOORE

On December 22, 1938, John L. Moore, a licensed osteopath with offices at Windom, Minnesota, entered a plea of guilty to an information charging him with the crime of practicing medicine without a license. The Honorable Charles A. Flinn, Judge of the District Court at Windom, sentenced Moore to pay a fine of $250.00 and court costs of $7.00. Moore paid the fine and costs in preference to serving a jail sentence.

The complaint against Moore was filed by Mr. Brist on behalf of the State Board of Medical Examiners following an investigation which disclosed that Moore was prescribing and furnishing medicine for the internal use of patients. In the instant case Moore had furnished and administered an alleged cough medicine for a 2-year-old girl. The little girl suffered a burn on the side of her face when some of the medicine came in contact with her face following her refusal to take the medicine. The parents attribute the burn to the cough medicine. Moore then prescribed some medicine for the burn.

The Medical Board's investigation disclosed that Moore was writing prescriptions that were being filled at one of the local drug stores for medicines of various kinds, all of which were to be taken internally. The records of the Medical Board show that Moore was warned as far back as 1930 to confine his practice to osteopathy for which he holds a license.

News Items

Fourteen applicants were granted licenses to practice medicine and surgery in North Dakota following a four-day semi-annual state examination in January. Licenses were granted to: Charles L. Nutzman, Grand Forks, Donald W. Fawcett, Devils Lake, Emanuel Bloedau, Bowman, Alton C. Grorud and Carl J. Baumgartner, Bismarck, Bernard J. Hughes, Bisbee, Joseph A. Hilts, Bowbells, Wilfred E. Shute, Flaxton, John H. Bartell, Hazen, Philip K. Arzt, Olga A. Miller and Edward A. Hackie, Jamestown, Merle J. Moore, New Rockford, and Nere J. Sundet, Gary, Minn.

Dr. B. A. Dyar, Pierre, South Dakota, has been appointed full time secretary of the inter-allied professional council. The council is composed of representatives of the medical, dental, nursing, hospital and pharmaceutical associations. Dr. Dyar will continue as medical supervisor of the farmers aid corporation.

Dr. F. J. Vollmer, Howard, South Dakota, recently returned to his practice after a year's study at Rush Medical college. He specialized in eye, ear, nose and throat diseases.

Dr. L. G. Dunlap, Anaconda, Montana, was elected president of the Mount Powell Medical society for the ensuing year at the annual election of officers December 19, 1938. He succeeds Dr. J. L. O'Rourke. Other officers elected are: Dr. O'Rourke, Anaconda, vice-president; Dr. LeRoy Bolton, Deer Lodge, treasurer; Dr. F. J. Malloy, Anaconda, secretary; Dr. O'Rourke and Dr. J. J. Malee, Anaconda, delegates to the state convention of physicians, and Dr. Terrill of Galen and Dr. A. C. Knight of Phillipsburg, alternates. The society is composed of doctors of Deer Lodge, Powell and Granite counties, Montana.

Dr. George H. Barbour, Helena, Montana, has been reappointed county physician.

Dr. Olaf Haraldson, Minot, North Dakota, was elected president of the Northwest Medical society, Dec. 22, 1938. Dr. A. F. Hammargren of Harvey was named vice-president and Dr. G. S. Seifert, Minot, was elected secretary-treasurer.

Dr. H. A. Crecelius of Plains, Montana, has been appointed county physician and health officer.

Dr. M. G. Danskin, Glendive, Montana, was elected president of the Southeastern Montana medical society at the annual dinner meeting, January 5. Dr. Carroll Lund, Fairview, was named vice-president and Dr. S. E. Olson, Glendive, was re-elected secretary-treasurer. Delegates to the annual meeting of the state medical association are Dr. J. H. Garberson, Miles City, and Dr. B. C. Farrand, Jordan.

Dr. J. L. Mondloch, Butte, Montana, has been reappointed Silver Bow county physician.

Dr. Carl Baumeister, formerly of Council Bluffs, Iowa, is now practicing in Robbinsdale, Minnesota.

Dr. J. H. Davis, Belle Fourche, South Dakota, was elected president of the Black Hills Medical society at the annual meeting held recently. Other officers are: Dr. G. W. Mills, Wall, vice-president; Dr. R. E. Jernstrom, Rapid City, secretary-treasurer; Dr. Lyle Hare, Spearfish, censor. Dr. F. S. Howe, Deadwood, and Dr. J. O. Threadgold, Belle Fourche, were named delegates to the state convention in 1939.

Dr. Nere Sundet of Gary, Minnesota, is now practicing in Northwood, North Dakota.

Dr. J. F. D. Cook, Langford, South Dakota, has been appointed superintendent of the state board of health to replace Dr. Park B. Jenkins of Waubay. The appointment was made by Governor Leslie Jensen.

Dr. Robert C. Ray, Eureka, South Dakota, has received the appointment of assistant surgeon in the navy with the rank of lieutenant in the naval medical corps. Dr. Ray at one time practiced in Forman, North Dakota.

Dr. John R. Neal of Springfield, Illinois, has been appointed Dean of the Cook County Graduate School of Medicine. This was announced by the Board of Trustees following their annual meeting in December.

Dr. A. W. Ward was elected chief of staff at Swedish hospital, Minneapolis, at the annual meeting January 21, 1939. He succeeds Dr. O. H. Peterson. Other officers are: Dr. Nels Gunderson, vice chief; Dr. Paul Gronvell, secretary; Dr. Charles R. Drake, treasurer.

Dr. G. R. Christie and Dr. B. V. Van Valkenburg, pioneer physicians of Long Prairie, Minnesota, were honored at a dinner sponsored by the Commercial Club, November 29, 1938. The meeting was given in appreciation of the many services the two doctors have rendered the community.

Necrology

Dr. Willis Henry Haviland, 74, of Butte, Montana, died at his home January 15, 1939. He had practiced in Butte for fifty years.

Dr. N. O. Dalager, 60, physician at Anamoose, North Dakota, for the last seven years, died December 27, 1938, in a Minot hospital. Dr. Dalager was born in Austin, Minnesota. He was graduated from Rush Medical School and for a number of years practiced at Clear Lake, Iowa, and then in Carpio.

Dr. Archibald A. McLaurin, 62, Pierre, South Dakota, died January 5, 1939, following a year's illness. He had practiced in Pierre for twenty years.

Dr. W. T. Stone, 83, retired physician of Park Rapids, Minnesota, died at his home December 25, 1938. Dr. Stone had been a resident of Park Rapids for 40 years and had established the first hospital in the community.

Dr. David L. Axilrod, 61, Minneapolis, died January 14, 1939. A retired physician, Dr. Axilrod had practiced medicine at Hutchinson, Minnesota, for many years.



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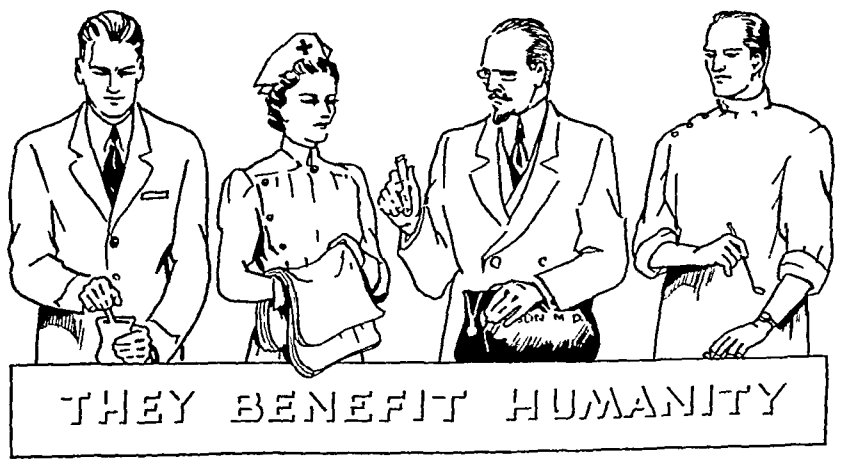
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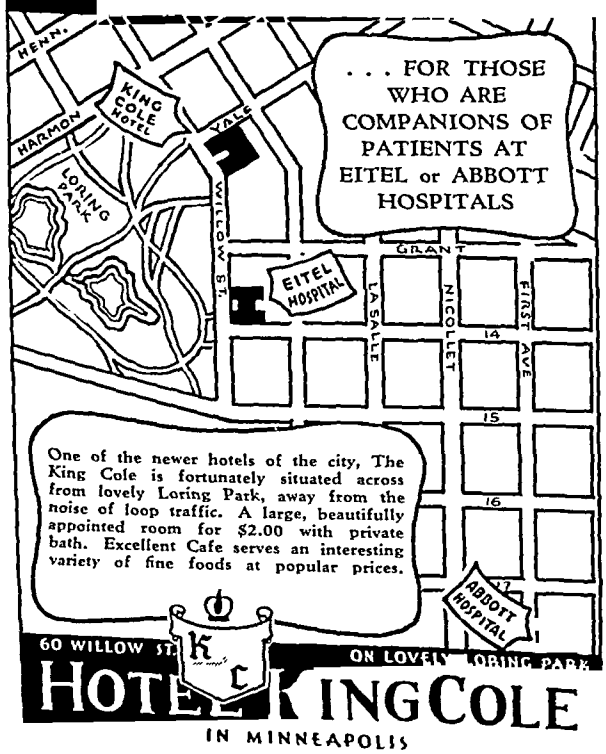
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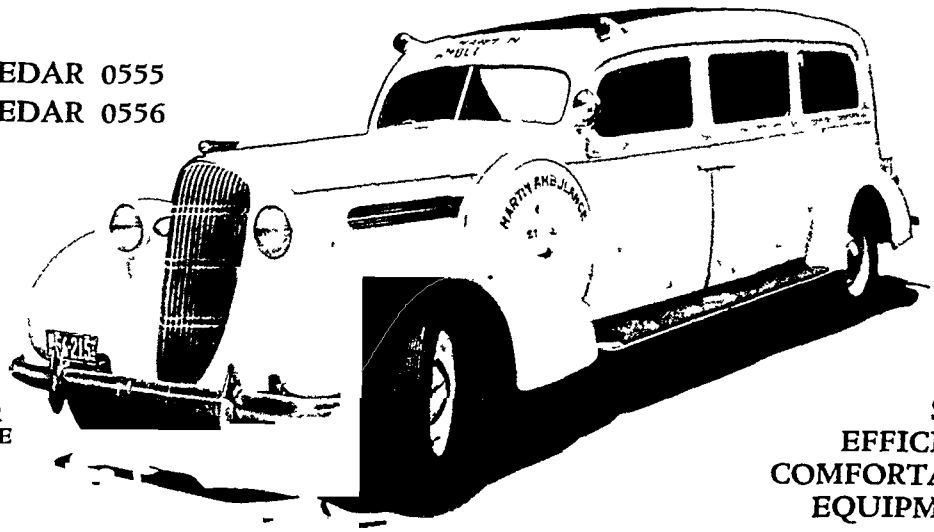
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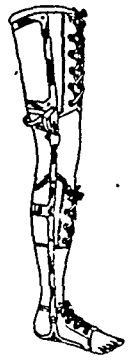
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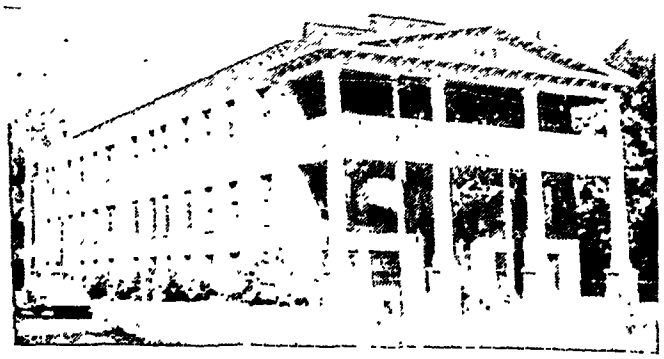
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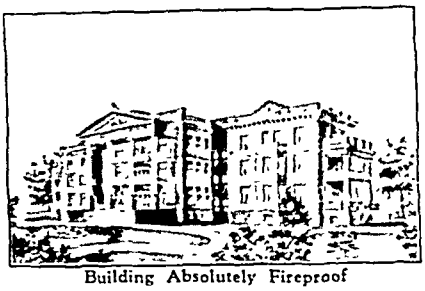
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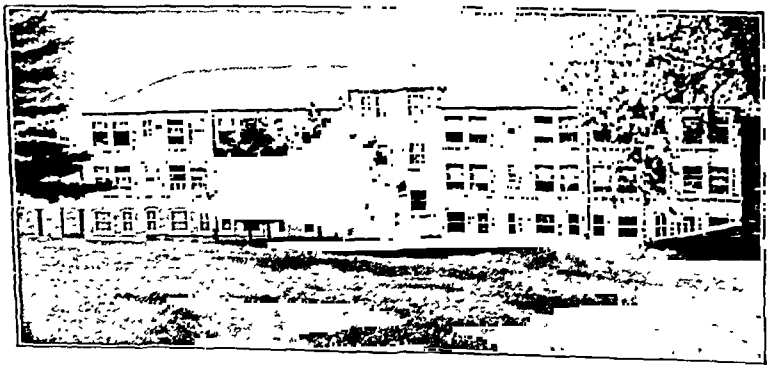
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Throughout the next six or eight weeks especially, it will be wise to take every possible precaution against pneumonia. Get plenty of rest—for pneumonia's greatest ally is fatigue. Avoid any over-exposure, particularly to extreme cold and dampness.

But above all, if anyone in your family has a cold and his or her temperature rises above normal, don't delay! Call your physician at once. Watch out, too, for chills, pain in the side or chest, and a cough. They, also, are danger signals that should be heeded promptly.

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But the pneumonia germ works fast, and every hour counts If your doctor's treatment is to be most effective, he *must* be called early.

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